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ABSTRACT

Presented are over 100 environmental education activities which use the local community for a learning site and resource. These lessons are grouped under seven topical headings: (1) biological neighbors, (2) physical environs, (3) built environs, (4) social environs, (5) understanding ourselves, (6) influencing change, and (7) improvement and restoration projects. Lesson plans include purpose, materials needed, procedure, additional notes, and references. Among the learning strategies employed are field trips, community inventories, simulations, values clarification activities, and community action projects. Intended for 9 through 18-year-olds, these activities have been compiled from currently available materials and are appropriate for use in both formal and non-formal educational programs. Appendices include listings of reference materials and sources of community information. (WB)

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STRATEGIES AND ACTIVITIES FOR USING LOCAL COMMUNITIES AS ENVIRONMENTAL EDUCATION SITES

Selected and Developed
by
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and
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ENVIRONMENTAL EDUCATION INFORMATION REPORTS

Environmental Education Information Reports are issued to analyze and summarize information related to the teaching and learning of environmental education. It is hoped that these reviews will provide information for personnel involved in development, ideas for teachers, and indications of trends in environmental education.

Your comments and suggestions for this series are invited.

John F. Disinger
Associate Director
Environmental Education

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ABOUT THIS VOLUME

In 1976, the Massachusetts Audubon Society initiated an out-of-school, community-based youth program called Earth Corps. The program is designed to stand on its own as a club or have the activities incorporated into existing youth groups, such as 4-H, Scouting, Y-groups, etc. Activities assembled for Earth Corps formed the base for this volume of strategies and activities of using the local community as a learning resource.

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PREFACE

The material in this volume has been selected for use in both formal and non-formal education programs. The objective is to compile for the leader some of the better strategies and activities currently available for inducing learning through involvement with the local community. The appendices provide insight into some of the resources that are likely to be available as data bases and information sources for any given community.

Because we perceive the use of the book by other than school personnel, we have chosen to use the terms leader and learner instead of teacher and student. The subtle difference in the implied relationship of the pairings is not only more comfortable in the non-formal situation, it also hints at a relationship that would be a profitable one for effective development of environmental literacy in many classrooms.

A few of the activities in this volume can be conducted in a meeting place or classroom, but the bulk of them are geared to the broader world beyond. Some of the activities can be undertaken in short time-blocks, but many demand involvement over a period of weeks or months. These time frames should be carefully considered in planning your program design.

> *...nobody can discover the world for anybody else. It is only after we have discovered it for ourselves that it becomes common ground and a common body, and we cease to be alone.*
>
> *And the world cannot be discovered by a journey of miles, no matter how long, but only by a spiritual journey, a journey of one inch, very arduous and humbling and joyful, by which we arrive at the frond at our feet and learn to be at home. It is a journey we can make only by the acceptance of mystery and mystification--by yielding to the condition that what we have expected is not there.*
>
> Wendell Berry, "The One Inch Journey"

RATIONALE

Community is a word with a broad range of meaning and no universally accepted boundaries. In one context it is the people who live in a locality, live under common laws and generally share common goals and problems; in another, it is a group sharing an identity or interest regardless of geography; it is also an association of plants and animals sharing common ecological conditions. Thus, the school and the creatures that live in and around it are a community and all belong to the broader global community of life. What, then, does this volume mean by community?

Our definition has been pragmatic. We are considering activities that explore the city or town where the learners live as community on a scale reasonable for study. We perceive that each such study site includes many sub-communities, both man-made and natural, that will be grist for intellectual milling, and that true understanding of the local community will point to the many interrelationships with an even broader community of life. One could say that the concept of community involves a continuously expanding scale going from family to global ecosystem and that we have chosen to focus on an area somewhere near the middle of the scale--one that is generally appropriate to the conceptual maps of the 9 to 18-year-olds to which most of the activities are addressed.

Community studies involve investigating and understanding human settlements as well as plant and animal communities. Human settlements and local biotic communities inevitably interact and it is the consequences of these interactions that enhance or disrupt the lives of the respective community members. Communities are integral units of ecosystems, which is why their boundaries cannot be sharply defined and why disruptions of any one community have repurcussions throughout the ecosystem. Indeed, we are dealing with a complex set of systems and subsystems and one aspect of community study should be a growing understanding and appreciation of general systems theory.

The six major purposes of using the local community as a study area are quite straightforward:

*to use a richly stimulating set of learning environments to motivate learning in youth:

> "Learning proceeds more rapidly and surely when the student deals with real objects, real problems, real situations as opposed to contrived programs. In part this is because dealing with reality is complex and requires extracting patterns. School materials are often too simplified to permit this basic process of learning. Similarly, the goal of learning should be real, not just passing an exam or getting a good mark."
>
> Leslie A. Hart

*to use the interest and concern of the near-at-hand to develop the ecological, holistic thought patterns that demonstrate linkage with both individual behavior and the global community:

> "Holistic thinking is the ability to recognize the various interacting parts of systems and develop an intuitive sense for the behavior of the whole system. A holistic perspective is an essential complement to the reductive approach if our students are to understand the nature of contemporary crises and work on their resolution. (We) can help students develop holistic thinking by starting with simple concepts, such as system and subsystem, and having the students apply this concept to increasingly larger domains, moving from small systems they can work with in the classroom to systems such as cities and countries. Such an approach will lead to improved student understanding of the interdependency of the elements in physical and human environments."
>
> Roger Bybee

*to provide a site for practicing and implementing real skills to the benefit of the very community that is helping support the teaching of these skills:

> "Students, faculty, parents, and community feel a renewed sense of worth and accomplishment. Goals such as these cannot be looked at lightly, for these should be the ends of education."
>
> John Dolson

*to involve more aspects of the local community in the education of its youth:

> "The foodstuff on which an embryonic community grows is communications. Messages about matters of importance--who needs what, who is giving what, and how can more be found or created? As a group is created to serve individuals, so that the group develops its own sustenance, preferences, norms, fears, and aspirations. Messages that clarify shared goals, identify scarce resources, and trace out the patterned effects of local effort become the lifeblood of a community."
>
> Malcolm Provus

*to multiply the learning experience by involving parents and other community members cooperatively in the learning process:

> "...the development of thinking processes in children and adolescents clearly indicates the need for two things: (1) the opportunity for the learner to do something with the empirical world, and (2) the opportunity to talk, argue, and otherwise reflect upon what

has been done, what it means, and how it fits or does not fit with previous ways of thinking."

Anton E. Lawson

*to motivate development and use of basic skills in reading, writing, and oral communication along with data gathering, computational, and decision-making skills:

"Reading, then, is a process of constructing meaning. It requires the reader to use a background of understanding--a script--to establish a conceptual chain. Readers must relate their previous knowledge to the author's message to develop a web of meaning. If this does not happen the reader will not comprehend the message...if however, these concepts and inferences are not available in his mind, it is impossible for him to comprehend the statements even though he might be able to pronounce every word of them."

Bess Osburn

"Through involvement in real projects, our students made an impact on the community and in their homes. But what about basics? Last year, our district education test scores increased close to 20 percent over the preceding year and were nearly 25 percent higher than schools in the area operating under 'traditional' science curricula. Our ninth-grade science enrollment increased from 35 percent of the student body to 85 percent while scholastic standards and requirements became more rigorous."

John Dolson

A major value in using the local community as a study site is that existing resources are used and therefore additional costs are minimized. Also, the process of inquiry is used--a process that explores issues for which pre-ordained conclusions are not available. As Tinbergen has noted, "a curriculum of conclusions is no longer appropriate; it is essential to investigate and understand the major problems facing humanity."

Thus the strategies and activities outlined in the remainder of this volume are selected to help leaders bring learners into contact with a complex world so that they can discover and reflect on patterns that they find and from these patterns develop lifestyles that can sustain life for themselves and others. It is a kind of survival education process to help us cope with the universe.

A man said to the universe:
"Sir, I exist!"
"However," replied the universe,
"the fact has not created in me
a sense of obligation."

Stephen Crane, 1895

STRATEGIES

Activities by themselves have little value unless they are placed in some type of structure that helps the learners mine meaning from the experiences. The way in which experiences are arranged for or with the learner we refer to as instructional strategies. Seven basic strategies which are particularly effective in environmental education are outlined below in order of intensity of commitment to actual involvement with the community:

1. Case Studies. These are assemblages of facts and viewpoints of particular issues. The issue may be very local or global. In our context, we are primarily concerned with case studies of community or regional issues. As a learning strategy, assembling and studying a case history offers at least three advantages: a) as a relatively painless way to acquire content, they are generally popular with learners; b) they invariably demonstrate the complexity of environmental problems; and c) they offer opportunities to develop critical thinking skills useful in examining environmental problems objectively and analytically.

Case studies can be prepared by leaders for presentation to learners (see A Teachers Guide to NOVA, WGBH, Boston, MA 02134) but most effective are case studies which address local issues and which are assembled by a group of learners. The leader acts as facilitator, but data gathering, data interpretation and presentation of the project should be a learner-centered group experience.

Although case studies should refer to specific events, issues, or approaches, a good case study will be generalizable and teach us about other analogous situations. All case studies, however, should actively deal with the following questions:

What are the various perspectives on this issue? (Provide evidence for each perspective).
What are the causes of the problem?
What are the interfaces between/among adherents of the various viewpoints?

In analyzing the case study, learners should develop and exercise the following skills:

- distinguishing between fact and opinion; that is, showing which statements are provable and which are not and which bits of information are accurate and which are inaccurate.
- generating and analyzing alternate solutions to a problem.
- spotting the bias of decision-makers from their statements and actions.
- distinguishing between information that is relevant and irrelevant to the issue.

Examples of environmental case studies can be found in The Science Teacher (Science/Society Case Study series, 1978-79), Audubon, Environment, and Defenders of Wildlife. Worldwatch Institute also publishes a series of inexpensive environmental case studies. These generally focus on national or international issues but are useful models. A useful reference for leaders is Citizens and the Environment: Case Studies in Popular Action by Lynton Caldwell, L. R. Hayes and I. M. MacWhirter.

2. Simulations. This strategy, as the name implies, involves learners in playing the part or role of someone or something (i.e., a raindrop). Simulations may take on several forms such as debates, games, creative narratives or plays. A series of simulations played out by youngsters entitled Earthways was aired by PBS, Boston, MA, in 1979. The Water Cycle and The River are both on a single inexpensive tape cassette and can serve as models for new, learner-developed simulations. In simulations, the leader may do most of the actual community exploration. Information is gathered and predigested to be put into a form that is most suitable to the vocabulary and/or learning level of the learning group. Information may be extracted from agency reports, historical documents, newspapers, actual artifacts, tapes of interviews and other sources, and may be put together as briefing packets for role playing, or presented in a combination of hands-on and leader-lecture format. Problems can be presented along with the source material and learners can solve the problem using the prepared background data. These solutions can then be compared with the historical decision on the same problem.

Similarly, a current problem can be investigated and the briefing packets can go home for discussion with parents. The group can come to its conclusions and then follow the issue in the community to its actual resolution. How similar was the learners' solution to that adopted by the community?

Useful references on this strategy are Handbook of Geographical Games by C.J.B. Wood, and Handbook of Simulation Gaming in Social Education by Ron Stadsklev.

3. The Community Resource Bank. This strategy depends largely upon information assembled by the leader, either alone or as a member of a team. Essentially, the community is surveyed and a bank of file cards is accumulated that records individuals, artifacts, trip sites, and other resources that could be used for instruction/learning.

A model Community Resource Inventory card might look as follows:

/CODE / 1 / 2 / 3 / 4 / 5 / 6 / 7 /

Individual/Agency: . . . . . .

Address: . . . . . .

Phone: . . . . . .

Time Availability: . . . . . .

Use Limitations: . . . . . .

Description of the resource or expertise:

. . . . . .

. . . . . .

. . . . . .

. . . . . .

ON REVERSE SIDE OF CARD

Evaluation of the resource with learners.

Best suited to the following abilities, interests, and maturity:

. . . . . .

. . . . . .

Problems encountered using the resource:

. . . . . .

. . . . . .

. . . . . .

Costs encountered, if any:

. . . . . .

Code explanation:

1. speaker
2. mentor/tutor
3. field trip site
4. loan materials
5. materials source
6. community service
7. other

By using such a code system, resources can be more easily retrieved or located.

Using the information in the community resources bank, the leader invites people to interact with the learning group in whatever manner seems most comfortable to the resource person. This may necessitate taking the group to interact with a particular site or community service. Some people are natural communicators, whether or not they have had any educational training; others are knowledgeable but relate poorly to certain age groups. Thus, it is valuable to keep the evaluation part of the cards up to date as advice to other users.

Learners should list some questions ahead of time which they would like to have explored by the resource person. Share these questions with the resource person beforehand; such question development helps set the scene as a learning experience and aids the resource person to prepare.

Some people use the community resource survey and subsequent visits to class or club as the whole approach. However, the resource survey file is a valuable tool for use in other strategies as well.

A useful reference on potential resources is Yellow Pages of Learning Resources, edited by R. S. Wurman.

4. Home Study Data Gathering. This strategy recognizes limitations in moving groups to all the various study places. It recognizes that individuals scattered throughout the community can gather large amounts of material that can be consolidated, organized, and analyzed in classroom or meeting area. Essentially with this strategy, group meetings are used to determine issues and problems to be explored, to design information-gathering assignments. The learners then interview people, visit sites, and collect materials at their convenience outside group meeting time. At later meetings, the information is examined and discussed and from that further actions may be taken.

The "Foxfire" publications by Eliot Wigginton are a highly successful example of this technique and have been used in modified form in many settings, rural and urban. A guide to "An Interview," developed at Hamilton-Wenham Regional High in Massachusetts, is a useful publication to assist students in interviewing techniques and can be found in Appendix A. Tape recorders are a valuable resource in this strategy, as are cameras.

5. Field Trips to Community Sites. Like the community resource file, the field trip is both a technique and a strategy. Strategically, it represents a direct exposure to segments of the cultural or natural community in action. The learners can observe and inquire into the processes at hand.

Good field tripping involves considerable planning logistically and intellectually. The leader must preview the site to determine its suitability and limitations for group visitation so that appropriate preparations can be made (i.e., resource people contacted and prepped, safety equipment assembled, permissions arranged, etc.)

A useful intellectual preparation strategy is webbing. A sample webbing from a good resource book (Nuffield Junior Science Teachers Guide 2) is given below. By building a web, the leader can anticipate questions that might be asked, equipment that might by needed. Thus forearmed, the leader can be prepared for any of a variety of directions that the learners' curiosity might take them.

Field trips can begin on the school site and expand out into the total community. They can be visits to places where learning is focused by resource people on the artifacts of the site itself or it can be a place where the learners actually become involved in the processes of the site. Each approach requires slightly different preparation. Two useful guides to the strategy are Outdoor Education on Your School Grounds by Norman Marsh, and The Local Community: A Handbook for Teachers by the High School Geography Project.

6. Community Inventory. This strategy is somewhat akin to the Community Resources Bank, but it differs in that the learners secure the information, rather than the leaders. Basically, the learners and the leaders assemble all the information they can concerning the resources base of the town. Soil maps, bedrock maps, and other such base materials are collected. The learners inventory the various plants and animals that live in the community. They map the major habitats of the community and assemble all this material in a common repository such as a town or school library.

Through this strategy, the learner gains an intimate familiarity with the resource base, to which is added the inventory of human community resources--cultural and job opportunities, transportation and communication networks, etc. As all this information is acquired and gradually synthesized, the learner becomes better prepared to rationally involve her/himself in local issues and come to action positions based upon broad understanding. This is a more long-range strategy than some of the earlier ones and may involve the same learners over a period of years.

A base reference for this strategy is the material produced by the Maine Environmental Education Project, Title III, ESEA, particularly Yarmouth, Maine, Community Environmental Inventory by Dean Bennett.

7. Community Action Projects. This strategy begins with action projects. The idea is to immerse the learners in an issue and have them learn their way to a solution while being a part of the solution. By questioning the learners as to their interests and concerns, action projects are selected. Individuals or teams of learners then set out to discover as much about the problem and potential solutions as possible, and involve themselves in implementing a solution. Such strategy may stand by itself or incorporate elements of the other strategies. It has a strong motivational power to recommend it, but runs the risk of tunnelvision solutions if the learners are not guided to see how the consequences of a particular solution impact on the wider world.

Examples of projects that have used this strategy are:

- The Institute for Environmental Education, Cleveland, Ohio;
- Project KARE, Blue Bell, Pennsylvania;
- Lee County, Florida, Environmental Education Project;
- various walkabout programs (Jipp and Weinhold, "Making Walkabout a Community Reality.")

8. Alternative Schools Using Local Resources. This is the most complex strategy and is based on a total commitment to using the community environment as the basic instructional medium. Only a few places in the country have committed themselves to this strategy. Examples are:

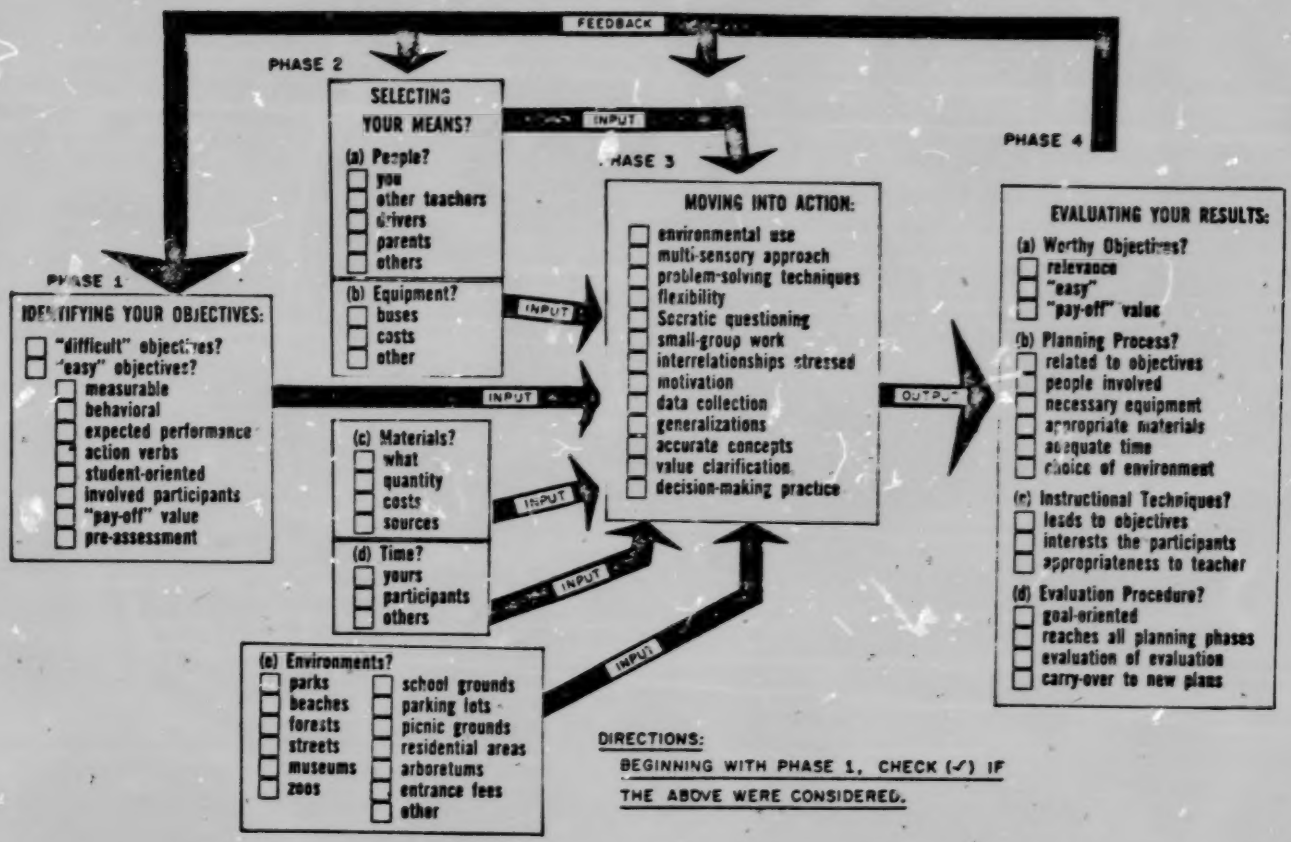
- The Parkway Program, Philadelphia, PA; see The School Without Walls by John Bremer.
- The Home-based School, Waltham, MA.

- Trailside School (now Audubon Expeditions); see Our Classroom in Wild America by Michael Cohen.

- Urban Alternative Strategies, reported by L. G. Lockwood under "Science File--Education" in Science Year: The World Book Science Annual, 1973.

Whereas each of these strategies can be considered as entities in themselves, most programs are some combination or hybrid of the strategies outlined. Each leader needs to determine the style most suitable to his or her personality and the learners with whom he or she will become involved. From such analysis will emerge the most appropriate strategy for the situation. With a strategy in mind, selection of activities becomes somewhat less confusing. The systems planning model and checklist devised by B. Ray Horn and reproduced below may be of help in planning.

SYSTEMS PLANNING MODEL AND CHECKLIST



DIRECTIONS:
BEGINNING WITH PHASE 1, CHECK (✓) IF THE ABOVE WERE CONSIDERED.

From "Environmental Education: A Model For Action" by B. Ray Horn, Science and Children, Vol. 10, No. 6, March 1973.

ACTIVITIES

ACTIVITIES

The activities and projects in this section are vehicles to involve the learner in the learning process, but they depend on having a leader who can create a good learning environment. To do that, it helps to keep in mind four points brought out in Donald Norman's book Memory and Attention: An Introduction to Human Information Processing:

- the material to be learned must be organized so that the parts fit together in a logical order;
- relationships within learners must be established between what we already know and the new material, so that the new fits with the old;
- learners must understand how the new information is relevant to their world;
- any mental activity performed on the activity which increases the depth of processing will help form connections that improve memory of the material, its retrievability.

The authors believe that an environmentally literate person should have some basic understandings in each of the following arenas:

I. Biological Neighbors
II. The Physical Environs
III. The Built Environs
IV. The Social Environs
V. Understanding Ourselves
VI. Influencing Change
VII. Improvement and Restoration Projects

Therefore, the various activities and projects are grouped into seven sections that correspond with these arenas. However, real situations seldom fit neatly into the pigeonholes of any classification system; thus, a number of projects could have been placed in several categories. An alert leader will scan through all the sections and not rely solely on the section identifications.

At the top of each activity is a code sequence to assist in determining some basic information about the use of the activity. The first item is a Roman numeral corresponding to the areas listed above. Although the activity may be useful in several arenas, only the primary one is noted. The second item is a pair of numbers which indicate the most appropriate age range for the activity. The next letters indicate group (G) or individual (I) activities, and the last letter indicates seasonal appropriateness--spring (Sp), summer (S), fall (F), and winter (W)--and a designation indicating appropriateness in any season (A).

In presenting the activities, we have tried to hew to a basic format; where the format does not do justice to the activity, we abandon it rather than force the activity to fit the format. It pays for us both to be flexible. A word regarding the category "Source" is in order.

Where we have used large segments of a source or even where we have significantly modified a specific reference at the time of drafting the activity, we have clearly noted the source. If it was from an ERIC reference, its document number is noted in parentheses. Where an activity was from the general literature, so widely dispersed that no original credit can be given, no source is listed. Nor is a source listed when it was drawn from the program materials of the Massachusetts Audubon youth programs, such as Junior Naturalist, Earth Corps, etc., for again, no specific source can be identified.

We must all recognize the great debt we owe to many creative and talented leaders who must go uncredited but whose real reward lies in the knowledge that their goal of helping learners learn is being carried on by compendia such as this one.

C. E. Roth
L. G. Lockwood

December 1979

CODING SYSTEM FOR ACTIVITIES

At the beginning of each activity, a code to help determine basic information about the potential use of that activity has been placed. The first item is a Roman numeral corresponding to the seven basic arenas utilized in this volume:

I. Biological Neighbors
II. The Physical Environs
III. The Built Environs
IV. The Social Environs
V. Understanding Ourselves
VI. Influencing Change
VII. Improvement and Restoration Projects

Although the activity may be useful in several arenas, only the primary one is noted.

The second item is a pair of numbers which indicate the most appropriate age range for the activity; for example, 7/12 suggests an age range of 7 to 12 years of age for learners.

The third item indicates group (G) or individual (I) activities.

The fourth (last) item indicates seasonal appropriateness: spring (Sp), summer (S), fall (F), and winter (W), plus a designation indicating appropriateness in any season (A).

Thus, the code I-7/12-I-Sp/F is translated:

> Biological Neighbors, ages 7-12, individual activity, appropriate for spring or fall.

5/6

Section I

Biological Neighbors

Activities in this section deal with exploration of the plants and animals that share the community with the human populace. These living things provide both a physical and psychological resource to people and comprise a vital interlocking web of life which is vital to our environment. The following activities should provide both awareness of other life forms and a growing understanding of the multiplicity of interdependencies among all living things from microbes to whales to humankind.

TITLE: Sunflower Magic

PURPOSE: Through watching and studying a sunflower a learner can learn about the importance of seeds and how many seeds it takes to feed a backyard population of birds. Sunflowers are easily grown in sunny areas and are fun to study.

MATERIALS: Activity #1: Sunflower seeds and a backyard plot.
Activity #2: A ripe sunflower head, a bird feeder.

ACTION: Did you ever look at a sunflower carefully? When you first plant a sunflower seed, a small flower pops up and this small flower will soon grow tall, lovely and with a head (blossom) full of seeds. As the seeds ripen the head gets heavier and heavier until it can no longer be held up and it begins to droop. The seeds then pop out onto the ground.

Activity #1: Plant a sunflower seed and watch your own sunflower grow. (Plant several in case one dies). Be sure you pick a sunny, well-watered place. Measure your plant each day and see how much it grows. Make a growth chart, putting down dates, growth, and notes on the weather. Did it grow more in sunny weather? Did the amount of rain make a difference?

As soon as your sunflower begins to droop and seeds are ripe, cut the head and bring it indoors.

Activity #2: Using the sunflower head, count the seeds in the blossom. How many seeds are ripe?

Put all the seeds, ripe and unripe, outdoors on a clean bird feeder, one that has no other seeds on it. Watch carefully and answer the following questions:

1. How long did it take for the birds to find your seeds?
2. How many different kinds (species) of birds ate your seeds?
3. How long did the seeds last until they were all eaten? A day? A week?
4. Did the birds eat the unripe seeds?
5. Have someone help you figure out how many sunflower heads you would have to grow to keep your feeder filled for a week, a month, six months.
6. Do you think you would have to put out more seeds in snowy weather?
7. Buy some sunflower seeds that have been prepared for humans to eat and try them. Do you think you would like to eat sunflower seeds often? What benefit do you get from eating anything? Find out why seeds are good for us and for the birds.

TITLE: Patience Watch (Teale Watch)*

PURPOSE: To observe living things going about their business unafraid requires sitting still and quietly for long periods, remaining alert and if possible being hidden. For observations to be meaningful, the observer must learn to keep careful and detailed notes.

MATERIALS: Notebook, pencil or pen, binoculars, camera, tape recorder (all optional). Also desirable is a pup tent or other blind or hide.*

ACTION: Locate a spot where you feel there are indications that wildlife is active, i.e., woodchuck burrow, stream bank, briarpatch, beaver pond, vacant lot. Find a comfortable place to sit where you are reasonably well concealed; that is, you don't leave a conspicuously human-shaped outline or silhouette; or go inside a blind.

Write down all the things you observe and feel while you are observing. What living things do you see? What are they doing? What direction are they moving? What direction is the wind blowing? How do they react to other living things? How do other living things respond to them?

Don't forget that worms, spiders, and insects are as worthy of observation as birds and mammals. The closer you observe, the more you will see. The more you learn to see, the longer you will be able to sit and observe.

Patience watches are almost like a sport; you have to go into training for them and develop your skills. Start with only 10 or 15-minute observation periods and work up gradually to observation periods of an hour or more. Some nature photographers stay in an observation blind from just before dawn to after dark. You will learn to cope with stiff muscles, itches, and parts of you "going to sleep." The reward is more and more intimate observations and insights into the lives of other living things.

Be sure not to make a quick movement or loud sharp noises, such as coughing or clearing your throat. These startle many creatures and send them scurrying for cover. Also, beware of flashing light from metal buckles and binocular lenses. You can write slowly, or whisper your notes into a tape recorder. Be sure your recorder is a quiet one, for the noise of the drive motor can frighten some creatures.

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*Edwin Way Teale, naturalist-writer-photographer, has a brushpile hut which he uses as an outside writing studio and an observation blind for wildlife.

Although this is primarily an individual activity, it can be modified to a group activity by:

1) Having the group scatter and observe for a predetermined time and then return to the group and share their observations.

2) Having teams run a 24-hour observation on a fox den or other animal lair and record the activity pattern for every hour of the day and night. Several sessions of this can reveal a great deal about an animal's activity pattern. Much of what is known about the European badger was discovered this way by a British teacher and his students.

TITLE: One Hundred Inch Hike

PURPOSE: To encourage close observations of the objects that are under our feet. To help learners to know that we often literally have to change our focus to broaden our horizons.

MATERIALS: Ball of twine, hand lenses, notebook, pencil.

ACTION: Have the learners choose a site for their hike. Grassy areas are good; so, too, are woodland areas. If possible, have the learners select routes that have more than one mini-habitat type.

Issue each individual (or team of two) a string 8' 4" (100"). Have them lay out the string any way they want to represent their "hike path."

Have the learners make a map of their "route." They can mark on the map the locations of interesting features during their explorations.

Have the learners get down on hands and knees and really explore the country through which their hike path goes. Things to look for:

a. Feel the ground for moisture. Does it change along the route?

b. Note each different kind of plant or animal along the way. Describe carefully the creatures you see whose names you do not know.

c. Look for pieces of dead plants and animals decaying into the soil. What creatures do you find that you think help in the decaying process?

d. Look for creatures feeding on plants. What special equipment does each one have for getting food from plants?

e. Examine the shape of leaves and their arrangement on the plant. How do such arrangements help the plants get adequate sunlight but not lose too much water by evaporation?

Note: At the end of this activity if the group is not too big, you might have each person or pair gather the group around each route and describe briefly what was found on the route.

TITLE: The Rotten Log Is Home

PURPOSE: To discover all you can about life in a rotting log.

MATERIALS: Warm clothing, large clear plastic bag.

ACTION: On a below-freezing day, take a trip into the woods and search for a small rotting log (one that will fit inside your plastic bag). Collect the log, bag it and bring it home.

Describe the log carefully. What kinds of plants are growing on it? Remember that mosses, lichens and molds are plants. A sketch may help describe the log as well as words.

After an hour or so indoors in the warmth, do you find animals moving in and around the log?

Break open a section of the log and observe what happens. Observe the log for several days. When you are finished observing your log put it on or near your bird feeder. How do the birds respond?

ADDITIONAL NOTES: You may wish to take a thermometer with you into the woods and study the temperatures. If you find a large, well-rotted log or stump, take a reading with the thermometer as far in as possible. Is it warmer or cooler than the surrounding ground? Do you think there is a reason why insects and salamanders hibernate in rotten logs?

TITLE: Conebearing Evergreens - Keying In

PURPOSE: To learn how to use a key, a basic tool for identifying plant and animal neighbors.

MATERIALS: Pruning clippers, a key to the conifers, envelopes.

ACTION: Plan and conduct a walk around the neighborhood looking for coniferous evergreens. Collect a small sample of leaves (one that will fit into the envelope) from each different kind of evergreen you find. On the envelope mark the date, the place, and a brief description of the tree.

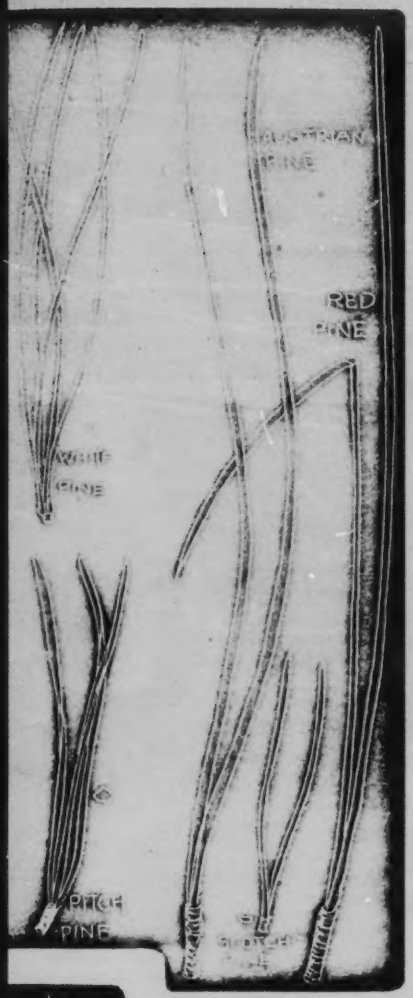
Have the whole group sort the samples into groups according to their ideas of which ones seem most similar.

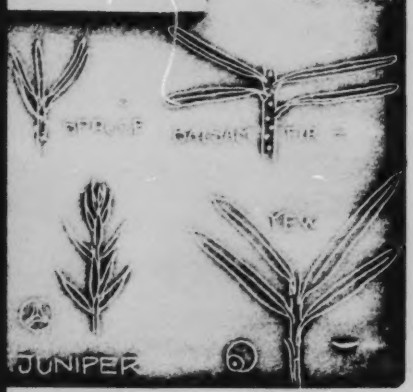
Introduce the group to one or more of the simple keys to conifers (see References below). Explain how a key is made by doing sortings similar to what they have just done. Have the learners work the keys to identify the conifers in the envelopes.

ADDITIONAL NOTES: This is a good activity for Christmastime when you can use keys to identify Christmas trees in the markets. You can follow up on this activity with Electric Learning (p. 41).

In built-up areas, be sure to get permission before collecting. Also, be sure to clip or cut samples, not tear them from the tree.

REFERENCES: Tree Finder, by May Thielgaard Watts;
Trees of Eastern and Central United States, by William Harlow.





CLUES FOR CONIFER DETECTIVES

(Outline form)

I. LEAVES NEEDLE-LIKE

A. Leaves in bundles

1. Leaves evergreen

   a. Five leaves in a bundle ..... White Pine

   b. Three leaves in a bundle ..... Pitch Pine

   c. Two leaves in a bundle

      (1) Leaves 2" to 3" long, twisted, blue-green.. Scotch Pine*

      (2) Leaves 3" to 6" long, stiff, do not break when bent ..... Austrian Pine*

      (3) Leaves 4" to 6" long, break easily..... Red Pine

2. Leaves deciduous (dropped in fall)

   a. Many leaves in a bundle, twigs knobby..... Larch

B. Leaves single

1. Leaves flat, tips do not feel prickly

   a. Leaves 1/2" or less, on tiny stems, 2 white bands below; twigs rough after leaves fall..... Hemlock

   b. Leaves 3/4" to 1", no stems; silver-white bands below; twigs smooth after leaves fall ..... Balsam Fir

   c. Leaves dark green above, yellow-green below; fruit red, berry-like; a shrub..... Yew

2. Leaves not flat, grow all around twig, tips prickly

   a. Leaves usually 4-sided; can be rolled in fingers; twigs rough after leaves fall ..... Spruce

   b. Leaves 1/4" to 1/2", one side gray-white, the other side green; fruit blue, berry-like, a shrub ..... Pasture Juniper

II. LEAVES SCALE-LIKE

A. Branchlets flattened, fan-like sprays; cones 1/2" long, oblong ..... Arbor Vitae

B. Branchlets not flattened; young leaf tips feel prickly, old ones do not; fruit blue, berry-like ..... Red Cedar

(* Introduced species)

TITLE: Habitat-in-a-Box

PURPOSE: To have learners observe various habitats and make models that include key physical, and plant and animal, features of each habitat; to provide an opportunity to share their learning with others. Participants should also gain knowledge and practice in concepts of scale.

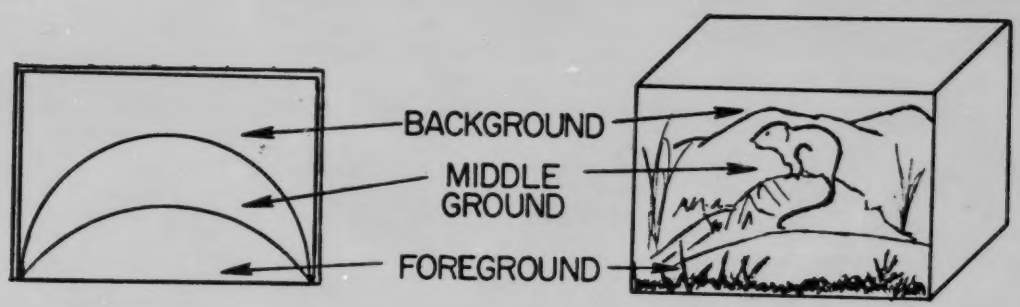
MATERIALS: Shoe boxes, scissors, glue, crayons, modeling clay, cotton, pipe cleaners, tempera paints, assorted natural materials.

ACTION: Have learners choose a habitat for study (field, marsh, woodlot, stream, etc.). Discover what are the most common plants and animals of that habitat. What physical features are most apparent in that habitat?

Once the habitat is understood, have the learners make as accurate a model of the habitat as possible in a shoe box. The most common plants and animals should be readily identifiable. Several techniques are possible:

1) Make miniature three-dimensional models of everything, using stones for boulders, twigs for trees, etc.

2) Use three scenes painted and installed in the box--a background, a middleground, and a foreground.



Put completed dioramas on display in local library, bank window, children's ward or similar site.

TITLE: A Bucket of Mud

PURPOSE: To encourage close observation of creatures seldom seen by many people, and to help the learners to look closely and discover distinguishing characters by sorting techniques.

MATERIALS: Plastic egg cartons, plastic spoons, water, a bucket of mud collected by either the learners or the leader, bowls or large plastic cups. Old newspaper and paper towels (if you are doing it indoors).

ACTION: Give each learner or group of two or three learners a bowl of mud, a spoon, and an egg carton. Have them search the mud for small creatures. Scoop out each finding and put it in a section of the egg carton with some water. Use a different section for each different kind of creature.

Additional activities are possible, such as: 1) Have the learners arrange the assembled creatures in groups according to which ones seem most alike; 2) If hand lenses are available encourage the learners to examine the creatures carefully and make drawings of the "mini-monsters" if they wish.

ADDITIONAL NOTES: Small groups allow good peer interaction and co-discovery and decision-making, although individual study is quite useful. Newspaper and paper towels indoors make this necessarily messy activity reasonably acceptable indoors or with handicapped children. Return all creatures to the wild after the activity.

SUGGESTED BY: Leonard Amburgey, Massachusetts Audubon Society

TITLE: Dirty Scavenge

PURPOSE: To test learners' ingenuity in collecting some of the key items and thus discover their levels of understanding. To help release physical energy while setting the stage for a learning experience.

MATERIALS: Paper, ziplock bags or plastic baggies.

ACTION: Divide the group up into teams of three or five. Issue each team four or five plastic bags and the list of items to be scavenged. Send them off on their hunt.

The list consists of the following items:

1. a handful of crushed rock
2. a handful of decaying leaves
3. a tablespoon full of water
4. a cup of air
5. a whole plant
6. a plant-eating insect
7. an insect-eating animal

When all teams are in, resolve who won the hunt, then ask the teams to gather round with all their material. Ask each team to take one empty bag and dump in the crushed rock. Next have them mix in the handful of organic material (the dead leaves). Now add the water and air and shake the bags thoroughly. What do you have in the bags as a result? If you said soil you are correct! Soils are all mixtures of different sizes of broken rock particles, organic material, and fluctuating amounts of air and water.

Next, look at the plant. Is it whole? That is, does it have roots, stems, and leaves? (We assume learners will collect higher plants but there is always the chance they won't. Be prepared to alter your comments accordingly). Plants need soil to supply water and minerals and support. "Plant" the plant in the little patch of soil.

Discuss food chains briefly, using the plant-eating insects collected and the insect-eating animal. When the activity is completed try to replant the plants and release all the animals.

TITLE: A Sweet Lesson: Maple Syrup and Sugar

PURPOSE: To have learners experience the process of converting "natural resources" into a useful product.

MATERIALS: Spikes, awls, buckets, maple trees.

ACTION: Every spring, maple trees become an important tree in the northern states. Not only are they lovely to look at, but they produce one of the sweetest natural products.

With your group, visit a "sugar bush" or a farm/sanctuary which gives tours and teaches about maple sugaring. Learn as much as you can about maple trees and how maple syrup is produced. (Local newspapers usually list such farms, sanctuaries, or "bushes").

Find some sugar maples on your own property or on a neighbor's property. Tap your trees (with permission, of course) either by making or borrowing materials. Boil the syrup down until it is the consistency you want.

If there is clean snow outdoors, pour the hot syrup on it and watch the syrup crystallize. This is called "sugaring off." If you have no snow, try shaved ice. Eat the sugared ice and enjoy.

(If you are not able to tap trees for syrup, buy some pure syrup and heat it. Then pour it on ice/snow for your sugaring off).

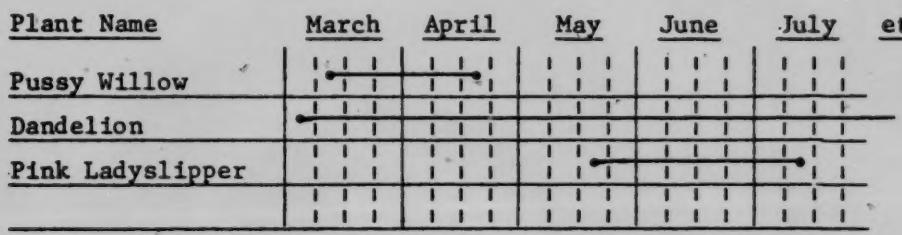
PEOPLE TO CONTACT: Farm owner or sanctuary director.

TITLE: Blooming Delight

PURPOSE: To have learners become involved in close observation of local vegetation and the sequence of blooming throughout the year.

MATERIALS: Wildflower field guides, pencil, paper.

ACTION: The learners establish study routes that they can visit regularly for observation. Learners identify as many of the plants on the route as possible. They should then create charts as below:



The learners should mark a dot in the week when they find the first blossom, and again when the flowers are all gone to seed. A line is then drawn between the two dots to indicate blooming period. Do the charts for different routes have the same bloom periods for the same species? Do the charts remain the same for several years?

The charts should be given to some agency that will collect them over the years--conservation commission, park department naturalist's office, Audubon club, etc.

TITLE: A Question of Diversity

PURPOSE: For learners to observe similarities and differences among plants of an area and develop an awareness of local diversity.

MATERIALS: 50 paper cups and/or egg boxes--enough for 50 or more segmented compartments per team.

ACTION: Divide the group into two teams. Have each team stake out claims to territory in the study area, preferably a field or lawn situation. Each territory should be roughly the same size. The leader provides each team with the cups or egg cartons.

The team members then explore their territory and gather a leaf or a small piece of each different plant they find. They should put their specimens in the cups or dividers of the egg cartons. Only one kind should be in any compartment. Each team should find as many different kinds as possible.

After a reasonable period of time, the team members should gather and be sure that only one kind is in a compartment and that each container does contain a different kind. The teams then count up the containers. Which team picked the site with the greatest species diversity? How many of these species do the youngsters have names for? You may want to key out some more.

REFERENCE: Outdoor Biology Instructional Strategies (OBIS), Lawrence Hall of Science, University of California.

TITLE: The Hidden Ones

PURPOSE: To have learners gain familiarity with a technique for roughly estimating the numbers of individuals of a species in a local area.

MATERIALS: Nail polish or airplane dope, plastic bags, art paint brushes.

ACTION: The process we are using here can be used on any animal you can catch and mark, be it bird, mammal, reptile or fish. However, since insects are easier to catch, we are using them in this activity. Choose a relatively common, easily caught species, such as the milkweed beetle or Japanese beetle.

Mark out a study plot of several yards in area.

--Day 1: Capture all the individuals of that species that you can and put them in your bags. Then mark each one on the wing covers with a dab of dope or nail-polish. (Different study teams might choose to use different colors.) Release them back in the study area. Be sure to record the total number marked and released.

--Day 2: Return to the study site and again collect all of the individuals of that species you can find. How many did you collect in total? How many of these were marked?

By using these numbers in the ratio that is called the Lincoln-Peterson Index, you can gain a reasonably good idea of how many of that species actually were in the study area.

Total Population	• Second day's total catch
1st day's marked insects	• # of marked insects in 2nd day's catch

Example:

Day 1 - 50 beetles caught and marked
Day 2 - 40 beetles caught and 25 are marked

$$\frac{\text{T.P.}}{50} : \frac{40}{25}, \text{ or } (25\ \text{T.P.}) = 2000, \text{ or } \text{TP} = \frac{2000}{25} \text{ or } 80$$

The approximate total population in the study area was 80 individuals. That is, even though you thought you found them all in one day, you actually missed about 30.

The Lincoln-Peterson Index is based on a number of assumptions which are seldom fully true. Thus, the figure is only a rough approximation, but suitable for beginning population studies.

TITLE: Peeping Tom

PURPOSE: For learners to become involved in careful, close study of several individuals of another species and discover their habits and family life.

MATERIALS: Binoculars, paper, pencil, clipboard, field guide to the birds.

ACTION: Carefully seek out a pair of nesting birds of any species. Observe them for many hours, being careful not to disturb their activities by your proximity.

Draw a rough map of the area, indicating vegetational types, the nest site of the birds you are studying, nests of other birds and singing posts, if any.

Keep notes on all the things the birds do while you are watching. Be sure to note how each member reacts to the other. How much of the cycle can you study: courtship, nest building, incubation, rearing of young, fledging of young, etc.?

Write up as detailed a biography of your pair as possible, based upon what you observed.

ADDITIONAL ACTIVITY: Birds are among the easiest to study, but you might wish to observe instead gray squirrels, white-faced hornets, or mud dauber wasps, or other fairly common and relatively observable creatures.

REFERENCE: Stokes, Donald W. A Guide To The Behavior of Common Birds.

TITLE: Who Goes There?

PURPOSE: To have learners observe an area closely to identify wildlife, large or small, or evidence of their activity, and to develop an inventory of the wildlife of a selected habitat.

MATERIALS: Pencil, paper, hand lenses (optional).

ACTION: Particularly the first time using this activity, select an area that has three fairly distinct habitats, such as woods, meadow, and the edge between the two.

Have the group briefly discuss the following questions:

1. What animals would you expect to find living in this area?
2. What are the needs of these animals?
3. What are some of the names of the places where animals live?
4. Where would you look for animals around here?
5. If we are unable to find an animal itself, what are some of the kinds of evidence we might discover that would tell us it lives here?

Have each learner, or learning team, explore one of the habitats, recording animals, or evidence of animals, seen. Have the learners figure out a way to indicate amounts of evidence or animals seen also. (Note: evidence would include tracks, excrement, dens, nests, fur feathers, cast skins, etc.) For each animal listed, have learners list possible foods in the area. If time permits, the learners or teams should similarly explore a second habitat and compare their findings for each habitat. What animals were the same? Which ones were different? For those creatures that were the same, did the amount of evidence or the number of sightings in each habitat differ?

TITLE: Community Superlative

PURPOSE: To have learners become very familiar with their community and explain some basic questions of property rights and the right of other species.

MATERIALS: Tape measure and/or meter stick for use in height estimates, a tree identification guide.

ACTION: Carefully survey the community to find the largest tree--that is, the largest around at 3 feet from ground level. What species of tree is it? You may wish to expand your hunt to finding the largest specimen of each of the five most common tree species.

Who owns the property on which these trees stand? What are the chances for their survival? Should these trees receive any special protection? What kind? Do these large trees have any special rights or are they natural resources to be "used" by people? What does "use" mean?

You may wish to add to your superlatives by discovering the tallest trees in the community of each of the species. Research techniques for estimating heights. (See Boy or Girl Scout Training Materials).

You may also wish to invite a forester to visit your superlative trees with his increment borer so he can help you determine the age of your big trees.

TITLE: Blackbird Boundaries

PURPOSE: To involve the learner in discovering the nature of territoriality among some animals, using a reasonably common species as an example.

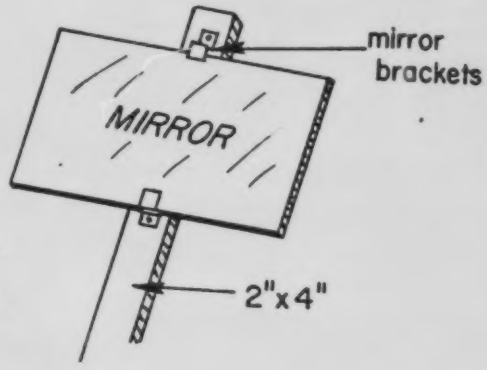
MATERIALS: Notebook, pencil, binoculars, post and mirror.

ACTION: Select a cattail marsh, roadside, pond edge or wet meadow which has two or more pairs of red-winged blackbirds. Find a comfortable spot and sit and watch them from a sufficient distance so that you don't bother them. Binoculars will be helpful.

Sketch a rough map of the marsh. Select one male bird to watch, and make an A on the map designating each place where the male lands on a perch to sing his konk-ker-ee song. Perhaps a friend can sit with you and watch a different male red-wing. Mark the second male's singing perches with a B. After awhile the perches marked on your map will begin to encircle the bird's territory.

Determine whether the bird regularly uses the same singing perches. Does each bird sing more from the center of its territory or the edges? Does each bird have a territory about the same size as the others? What happens when one male approaches or enters another's territory?

As a supplementary activity, you may wish to temporarily set up a post with a mirror attached a few feet from one of the favorite singing perches (see diagram). How does the male respond to his reflected image? Does this differ from his response to other red-wings? Male red-wings defend their territories in two ways. Can you discover them? Which method is used most? What is the advantage of "settling disputes" in this manner?



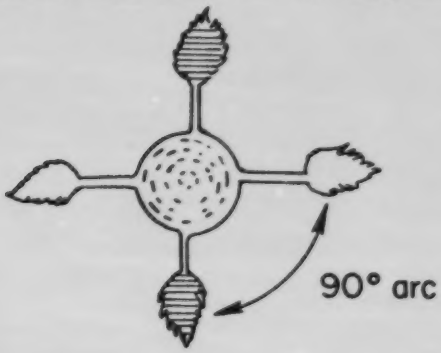
REFERENCE: "Ranger Rick's Activity Guide," April 1979, National Wildlife Federation.

TITLE: Life Spiral Hunt

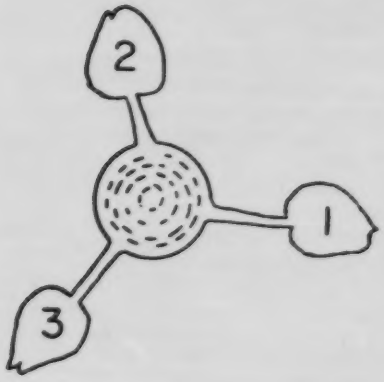
PURPOSE: For the learner to discover the variety of patterns by which leaves are arranged on a tree to achieve optimal exposure to light and to discover the mathematical series that this represents.

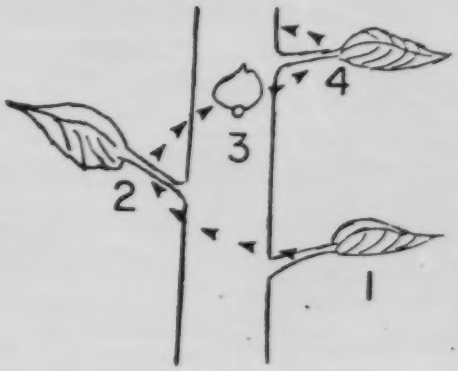
MATERIALS: Notebook, pencil/pen, string/protractor, tree identification guide.

ACTION: Each tree trunk and branch is a circle. Leaves and branches emerge from that circle in definite patterns. There are two major arrangements--opposite and alternate. In this country, most trees and shrubs have alternate branching. The few opposite include maples, ashes, dogwoods, horsechestnuts, and the shrubs of the Caprifoliacea (viburnum family). Their leaves and branches all emerge opposite each other at 90° angles.



Most of the rest of our trees and shrubs are alternate in branching habit. Their vertical positioning forms a spiral.





Choose a tree and with a piece of string hold one end on a leaf and wind your string around, touching each leaf until you find the string again directly above the first end. How many times does the string go around the branch to do this? Not counting the first leaf, how many leaves does it touch in its path? Record these as a fraction. For our drawing, the fraction would be 1/3. For the opposite branching, it would be 1/2.

Now go out on a plant hunt and record as many different spiral fractions as you can, using the format below:

Plant Name	Spiral Fraction

Do you find some fractions more common than others? Arrange the fractions in serial order from lowest demoninators to highest denominators. Do you see a pattern? (1/2, 1/3, 2/5, 3/8?) Could you extend this series? (5/13, 8/21, 13/34, etc.?)

These spirals occur in other plant parts--the bracts of pine cones, the spiral arrangement of sunflower seeds in the flower head, the leaf rosettes of cabbage, the leaves of mosses and many others. How many of the extended fraction series can you discover in your area?

REFERENCE: Rutherford Platt, This Green World.

Section II

The Physical Environs

All of the basic chemical elements that compose complex organizations of living things are derived from the physical environs--soil, air, and water. Of at least equal importance is the energy that we use which directly or indirectly derives from the sun and other cosmic bodies. Activities in this section deal with these elements and the ways people have used or abused them.

TITLE: Solar Ups and Downs

PURPOSE: To learn how the sun's altitude changes throughout the day, and if desired, how the midday altitude of the sun changes throughout the year.

MATERIALS: 21 x 28 cm. sheet of cardboard, scissors, glue, shadow-caster chart.

ACTION: Build a shadow caster according to directions (p. 32). Glue the device to the cardboard sheet for greater stability. Record the noon altitude of the sun at weekly intervals for several months or, better yet, for a whole year. BE SURE THE SHADOW CASTER POINTS STRAIGHT UP (90° from horizontal).

Notes: Determining solar altitude is important for determining whether a particular site is suitable for an investment in solar energy systems, either active or passive. Learners interested in solar energy should do this activity.

REFERENCE: Clinard and Collins, Energy Conservation in the Home.

CUT TOP

SHADOW CASTER

TOP CUT

CUT NOTCH

FOLD UP ALONG DASHED LINES

ALONG DASHED LINES FOLD UP

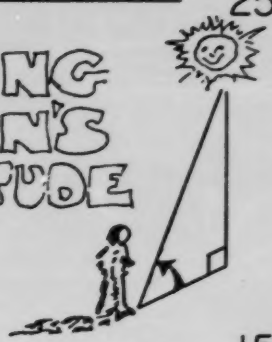
SUN LINE

80°
70°
60°
50°
40°
30°
20°
10°

75°
65°
55°
45°
35°
25°
15°

NEVER LOOK DIRECTLY AT THE SUN

FINDING the SUN'S ALTITUDE



SHADOW SCALE

SUN LINE — POINT THE ARROWS TOWARD THE SUN —

1. Cut along top edge as indicated; cut notch in top edge.
2. Fold along dashed line so top edge points straight up.
3. Place the shadow scale in front of you with the sun line pointed toward the sun.
4. Turn the shadow scale so the notch's shadow falls directly on the sun line; be sure the shadow caster points straight up.
5. The shadow of the TOP edge of the SHADOW CASTER will fall on the scale, marking the sun's altitude.

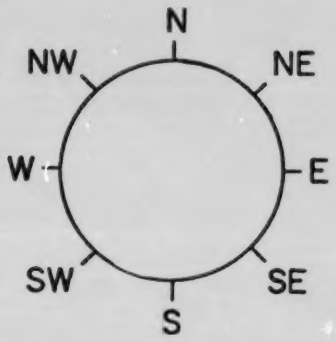
(Adapted from a design by David C. Ulmer of Colorado Springs, Colorado)

TITLE: A Place in the Sun

PURPOSE: To determine where the sun rises and sets in relation to your home and to determine local wind patterns.

MATERIALS: Paper, mathematician's compasses, directional compass, pencil.

ACTION: Draw a circle with the compass and divide it according to the diagram:



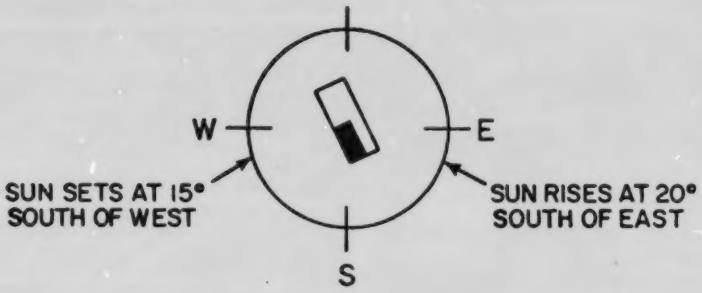
In the center of your circle, draw a rough floor diagram of your house as it would be seen directly from above. Orient the long axis of the house properly on the diagram. Note where the sun rises and sets. (This will vary with the seasons of the year.) Mark on the chart prevailing wind direction, direction of major summer storms, major winter storms.

With this information you should be able to tell where in the house it is most essential to concentrate energy conservation measures and take maximum advantage of passive solar collection.

Also included here (pp. 34-35) is more detailed information on related activities.

REFERENCE: Clinard and Collins, Energy Conservation in the Home.

The way in which your home is oriented to the sun and wind affects the impact of the climate and the energy needed to maintain comfort. To understand this concept, it is helpful to determine the compass orientation of your home. First, think of your home as a box (usually a rectangular box) and view it from a bird's perspective. Given the directions of the compass on the circle below, locate your house in the center facing the appropriate direction. Use a compass to determine which direction each side of your home faces. It may not be directly N, S, E or W, but using the face of the compass and this circular representation you should be able to make a good estimation of the direction. Once the house is sketched on the circle, use your compass to locate the point at which the sun rises and sets.

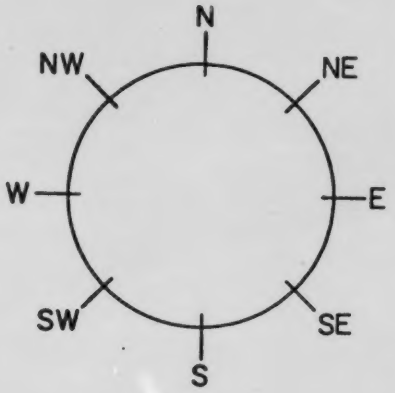


In the example to the left, the house is rectangular and the living area (the family room/ kitchen) is represented in black. You can see that the long axis of the house runs slightly W of North by slightly E of South. The points indicating the sunrise direction and sunset are marked. Conclusion: The family room area will receive the afternoon sun and be a "sun warmed" area. This could be beneficial or bad, depending on the climate.

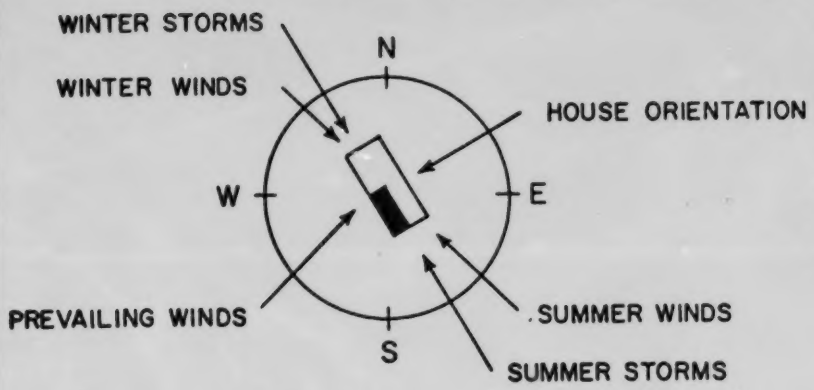
Use the circle on the right to locate your house.

Instructions:

1. Draw in your house's orientation to the compass.
2. Draw in where the sun rises and sets.
3. Where are the living areas (den, family room, kitchen) of your house in relation to the compass?
4. Are the living areas exposed to morning or afternoon sun?



In addition to the sun, the winds also can be located on a similar drawing. Using the same example, we can illustrate the direction from which the winds affect the house. Information about winds can be found through observation or by inquiring at your local weather bureau, agricultural extension service, or news agencies. There may be slight differences within a local area due to hills or water.

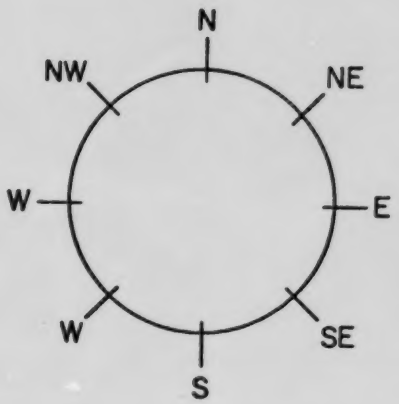


In the example, the living area is only exposed to prevailing winds and slightly to summer storm winds. The winter winds are from the NW, so the example house should not have large window areas on the NW side if it is located in a temperate or cool climate zone.

Use the circle on the right to locate your house.

Instructions:

1. Locate house orientation.
2. Locate prevailing winds.
3. Locate summer winds and summer storms.
4. Locate winter winds and winter storms.
5. Which areas of your house are exposed to storm winds? To winter winds?



WIND ORIENTATION

Question: Do you feel your house has a good or poor orientation to the sun and wind? Why?

Suggestion: The teacher may need to demonstrate how to use a compass. Locate the classroom on a circular grid.

TITLE: Finding the Sun's Azimuth

PURPOSE: The activity gives the learner a tool to measure the sun's azimuth and to describe how the sun's azimuth changes during the day.

MATERIALS: 21 x 28 cm. sheet of cardboard, glue, nail (2 to 5 cm. long), compass, azimuth scale.

ACTION: Construct an azimuth scale according to the accompanying directions. Use the device to record the sun's azimuth at one-hour intervals throughout a day. NEVER LOOK DIRECTLY AT THE SUN.

Notes: Azimuth is one coordinate used by surveyors, navigators and astronomers for locating objects. Azimuth is measured along the horizon, beginning at the NORTH point (0°) and increasing toward the EAST (90°). The azimuth of an object in the SOUTH is 180° and toward the WEST is 270°.

As the sun appears to move across the daytime sky, its azimuth steadily changes. Recording these azimuth changes helps one understand the apparent motions of the sun.

REFERENCE: Clinard and Collins, Energy Conservation In The Home.

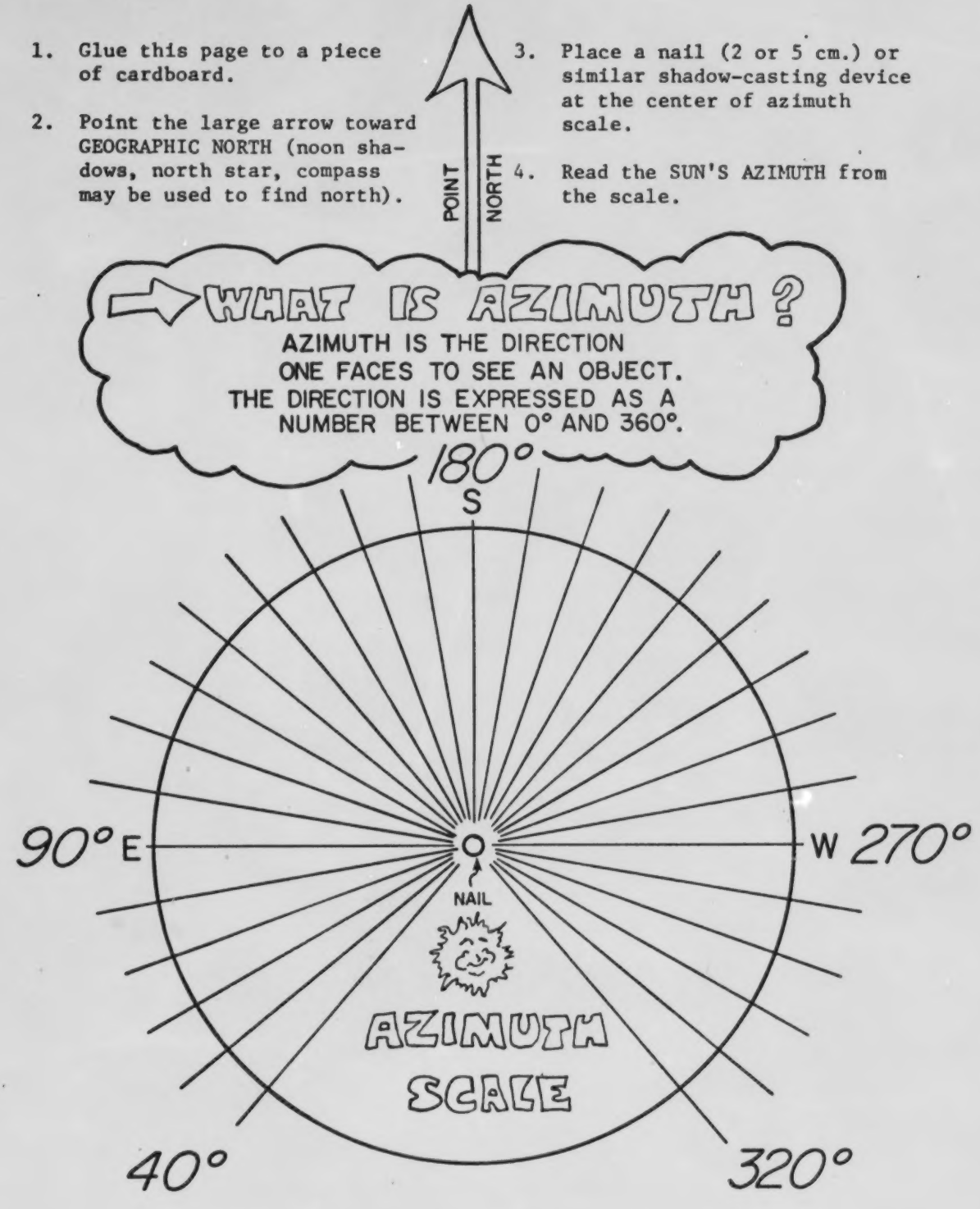
INSTRUCTIONS

1. Glue this page to a piece of cardboard.

2. Point the large arrow toward GEOGRAPHIC NORTH (noon shadows, north star, compass may be used to find north).

3. Place a nail (2 or 5 cm.) or similar shadow-casting device at the center of azimuth scale.

4. Read the SUN'S AZIMUTH from the scale.



(Adapted from a design by David C. Ulmer of Colorado Springs, Colorado)

TITLE: Night World

PURPOSE: To give learners an increased understanding of what goes on in the natural world at night. Many peoples' experiences at night are very limited and seldom have included night-time nature exploration.

MATERIALS: Flashlight, red transparent plastic or cellophane (optional).

ACTION: Choose a path through several habitats. Preferably choose one that the learners are reasonably familiar with during daylight hours. (This helps reduce fears and enhances comparison between what is happening there day and night).

Form a single file with leaders at both ends. Space older learners at intervals if the age group is mixed. If the terrain is rugged, have each person hold on to a rope stretched between the leaders. Keep as silent as possible as you walk. Stop frequently. Keep all senses at full alert.

Explore some or all of the following questions or activities:

a. Listen for dew dripping, a branch breaking or falling, branches rubbing together, footsteps, a sudden silence, insects calling.

b. Smell damp earth, indications of animals (skunk or fox scent, for example), fragrant plants. Think about why these are more noticeable at night than during the day.

c. Hold a flashlight at the side of the head (eye level) with the beam directed forward. Look for eye-shine. Tiny ones may be spiders!

d. Use flashlight with red cellophane covering to observe some animals with minimum disturbance. (Most night-active creatures cannot see in the red end of the spectrum, but we can).

e. Feel the trail underfoot; feel grass, leaves, twigs. Touch moss, fern, bark. How does each feel different than in the daytime? What animals are abroad now? Why?

f. Crouch down to silhouette leaves against the lighter sky. Can you identify the trees by their silhouettes? By the feel of their bark?

g. Keep alert for "air streams." On slopes where there are openings in the vegetation you can often discover streams of cool air flowing down the hillside.

h. During migration season look at a full moon with binoculars. Watch for birds flying across the area lighted by the moon face.

i. Look for insects around lights or bait moths in summer with a mix of fruit pulp, molasses, and stale beer.

j. Look at the stars; help everyone spot the circumpolar constellations that can be seen in every season, and then some seasonal constellations. Tell some Greek and Native American myths that relate to some of the constellations.

After the walk have a fireside debriefing chat where the learners can share their observations and feelings about their night experiences.

TITLE: A Mystery Museum

PURPOSE: To sharpen investigative skills in a way that's fun.

MATERIALS: Member-collected mystery objects, paper and pencils.

ACTION: Each member agrees to bring five mystery objects to the meeting. These can be whole objects or pieces of objects --i.e., potato sprout, root of Solomon's seal, coffee grounds, hinge from an oyster shell, and so on.

Distribute the objects around on a table. Have everyone study the objects and write down:

1. What the object is
2. What kingdom (plant, animal, mineral) it belongs to
3. Where you think it was found

When everyone has had a chance to comment on everything, have each person go around and tell what the objects were that he/she brought and where the objects were found. Allow 2 points for each correct object. The winner gets to take the whole museum home to try out on his/her family.

TITLE: Electric Learning

PURPOSE: This activity teaches both the subject matter of the card and something simple but basic about electrical energy. Perhaps of greatest value, however, is the sharing of knowledge with others. There is opportunity for group decision-making in deciding the topics and sharing procedures.

MATERIALS: Cardboard, aluminum foil, masking tape (1" wide), binder punch, nature pictures, specimens, or related objects and glue.

ACTION: Following the directions below, have the learners prepare an electric learning board. They can use pictures such as National Wildlife Federation stamps or they can glue on winter twigs, small stones, etc.

Having made a learning board, learners should trade among themselves, take them home to family, give them to the children's ward of the hospital or in some way share them with others.

ADDITIONAL NOTES: Confusion is somewhat less if you have materials arranged so that groups of three learners can work together. Thus, leaders provide several small bottles of glue rather than one large one.

DIRECTIONS:

Materials Needed:

Pictures or specimens to be named	Aluminum foil
Two pieces of cardboard the same size	masking tape
Piece of insulated wire long enough to reach diagonally from one corner of the board to the other	flashlight battery, "C" size
	flashlight bulb

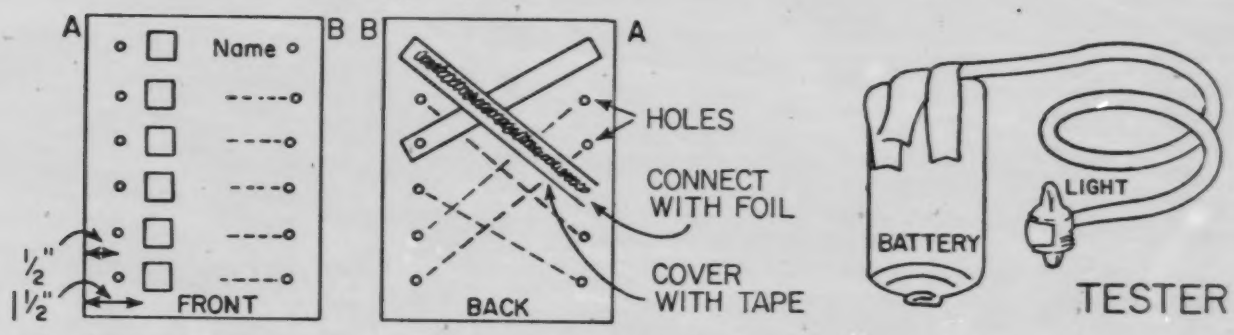
1. Arrange the pictures or specimens down one side of one piece of cardboard, spacing them properly, keeping them at least 1-1/2 inches in from the edge. This will be Side A.

2. Punch a hole for each object at least 1/2 inch in from the edge. Use a paper punch which makes a large hole.

3. Punch matching holes along the opposite edge of cardboard at least 1/2 inch in. This is Side B.

4. Put strips of aluminum foil about 1 inch wide and long enough to go diagonally from a hole on Side A to a hole in Side B. Do not use a hole on B directly opposite the

hole on A. Fold the aluminum foil in thirds lengthwise so the strip is thick but still wide enough to completely cover the holes.



5. Turning the cardboard over, run a strip of foil from the first hole on Side A to one of the holes on Side B. Completely cover the foil with a strip of masking tape. Then run another strip of foil between two more holes and cover with masking tape. Continue in this manner until all the holes have been connected.

6. Paste your picture in place alongside the holes on Side A. Write the names beside the holes on Side B. Be careful to check each one with your tester before writing anything so that you surely get the right name beside each hole.

7. Tape the second piece of cardboard onto the back of your electric naming board so that the connections are covered.

8. To make the tester, cut about 1 inch of the insulation off both ends of the wire. With masking tape, tape one end to the flat end of the flashlight battery and the other end to the metal side of the flashlight bulb, leaving the metal end of the bulb free.

9. To use your electric board, place the metal end of the bulb on the foil in a hole on Side A. Place the metal connecting point of the battery on the hole on Side B which you think goes with the hole you have used on Side A. If it is the right hole the bulb will light up.

TITLE: A Mineral Treasure Hunt

PURPOSE: To become aware of the pervasiveness of minerals in our daily lives and to explore connections between finished products and raw materials.

MATERIALS: Pencil and paper.

ACTION: Divide the learners into four groups. Each group should have a pencil and pad of paper and one person to be the scribe.

Each group should face one wall and be also assigned one-quarter of the floor and ceiling.

Then list all the things you can see that are either minerals in themselves or contain minerals in them. Where possible, tell what the minerals are. Don't forget small things like light bulbs or door stops.

> Some examples include: plaster/gypsum; glass/silica; light bulb filament/tungsten; metal light switch plate/iron, limestone, carbon; bronze doorknob/copper, tin; eyeglasses/gold, silica; brick/feldspar, clay; cement/limestone, mixed sand and gravel; water pipes/copper; radiator covers/aluminum; jewelry/silver, gold; nails and screws/iron, limestone, other metals; plaster/oil.

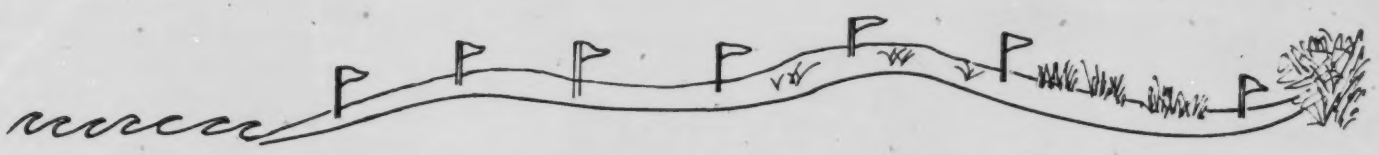
After 15 minutes, compare lists. What did one group overlook that another group found? What would happen to our world if minerals were no longer available to us?

TITLE: Transect Study on the Beach and Dunes

PURPOSE: To provide, through measurements taken by the transect method (placing a straight line over an area including different characteristics--wet to dry, for instance), data to help learners discover natural relationships. To gain experience with the tools and techniques used in studying ecology.

MATERIALS: Plastic bags--a large one for each team, and smaller ones for plants, insects, etc.
Rulers and thread
Explorer journals and pencils
Empty thread spools, elastic bands, thumb tacks, thermometers, alcohol, trowels, magic markers, stakes, string and large wrapping paper for displaying samples.

ACTION: Divide the group into teams of two learners; assign teams to a station on the transect line. Group will help decide where to place the transect line, how long it must be and how many feet need to be left between stations. Each station should have the same diameter (see illustration below).



ocean beach foredune rear dune dense grass shrubs

Profile of Transect Line
along beach and dune

Each station should look something like this →

Each team will make a series of simple measurements and collections which they will report on as follows:

- Plant Life Data: type, height, abundance, cover density, etc.
- Temperatures
- Soil Moisture
- Soil Compactness
- Soil Sample
- Wind Velocity
- Other Collections (insect signs, crustacea, etc.)

These measurements and data are recorded as shown on the data sheets (Addendum 1).

After each team has carried out its measurements/collections the information should be shared in a central place, placing all data on a wall chart (see suggested format, Addendum 2). In comparing some of the findings, the group is able to quickly understand differences in the various stations along the transect line, which can lead to some helpful discussions.

SUGGESTED DISCUSSION TOPICS:

1. What does our study indicate about plants that can survive at either extreme of the transect line?

2. What do you think is the most important environmental factor controlling distribution of organisms along the transect line? In this discussion, more than one factor will be cited; try to place each point in order of its importance related to other factors.

ADDITIONAL INFORMATION:

ADDENDA 1 and 2 contain specific instructions for the gathering of data and recording of findings.

ADDENDUM I

Transect Study

Recording the Data

1. Plant Life Data

   a. abundance--# of plants in plot--10 or less, 10 to 50, etc.
   b. cover--% of plot covered by plant (estimated)
   c. density--continuous (touching, scattered, in groves, etc.)
   d. height--(ankle-high, knee-high, over the head, etc.)

   Use this format:

Plant Life Data Sheet		Plot #		
Type of Plant/Species	Height	Abundance	Cover	Density
1.				
2.				
3.				
4.				

2. Temperature Readings--Take at different positions

   4' above ground _____°
   ground surface _____°
   sub-surface
   6" below surface _____°

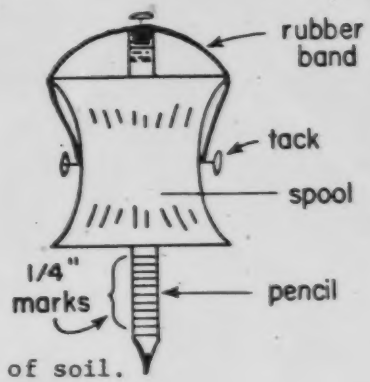
3. Soil Moisture (check one)

   dry--falls apart, sifts through fingers _____
   slightly moist--does not stick together _____
   moist--sticks together when squeezed _____
   very moist--when squeezed, feels wet _____
   wet--water drips when soil is squeezed _____

4. Soil Compactness

   Make the measuring instrument before the field trip. Shave one side of a pencil and mark off 1/4-inch spaces. Place pencil down through center of spool, attaching rubber band across top of pencil eraser and to either side of the spool as shown.

   Use the instrument by grasping the spool and shoving the pencil into the soil, reading the distance the spool measures on the scale on the pencil. Read the scale when the lead point of the pencil is covered.



5. Soil Samples

   With trowel, gather and put in baggies samples of soil.

6. Wind Velocity

Hold a bit of thread in a vertical position. Record the estimated angle at which the wind blows the thread at each of three heights:

overhead _____
at waist _____
ground level _____

Estimate angle = 45°

7. Other Collections

Collect a leaf or twig from each type of plant in your plot
Collect insect signs, crustacea or other signs of living or non-living inhabitants on parts of your plot.

Put all samples into individual bags; label as to where found.

Be ready to add your data to the total transect study data wall chart (see Addendum 2).

ADDENDUM 2

Suggested Wall Chart Transect Study

	Types of Plants	Temperatures	Soil Moistures	Soil Compact-ness Samples	Wind Velocity	Collected Materials
PLOT I						
PLOT II						
PLOT III						
PLOT IV						
ETC.						

TITLE: Behind the Faucet

PURPOSE: To help the learners gain an understanding of the source of the water used in the community.

MATERIALS: Topographic maps and/or geologic groundwater availability maps, tracing paper, pencil, water test kit (optional).

ACTION: Determine whether the main water source is from surface waters or groundwater. Then do either Activity A or B. In some communities it may be appropriate to do both.

Activity A: Surface waters

Construct a map of the watershed that supplies water for your community. Use a topographic map and trace the outlines of the watershed. On the map identify the following items:

(1) Source of input and/or treatment facility (waterworks).
(2) Location of nearby communities (including population figures).
(3) Location of industrial sites.
(4) Potential sources of pollution of effluents which might affect the water supply.
(5) Location of any water impoundments.

Explore the watershed and locate and map forests, marshes, grasslands and other features that help hold water in the watershed. Locate sources of erosion that could silt up impoundments. Find out what laws and regulations help protect the water quality in the watershed. How well are these laws enforced?

Activity B: Groundwater

Invite a well driller, or geologist, to speak to your group about groundwater aquifers of the area and how these aquifers are recharged as water is taken from them. Using local topographic maps, groundwater availability maps, and geologic maps, have the learners create a map of the possible aquifers found in the area. On the map locate what homes and/or industries are tapping the various aquifers. Find out if possible the potential groundwater flow in gallons per minute for each aquifer. Find out if there are any potential development plans that might affect the recharge areas of the aquifers.

Is there any storage of toxic chemicals or road salt where they might leach into the groundwater supply? What is the water chemistry of the water from each aquifer (pH, hardness, etc.)? What laws and regulations exist to protect the quantity and quality of the groundwater supply? How well are these laws enforced?

Additional Activity:

An interesting auxiliary experience is to have a local water dowser visit the group and demonstrate his or her ability. Some dowsers will also work with the learners to see if any of them have dowsing ability. Scientists don't know how dowsing works, but it apparently does for some people.

REFERENCE: Center for the Development of Environmental Curriculum (ED 099 230).

TITLE: Sound Search

PURPOSE: To build learner's awareness of the variety of sounds in the immediate environment and their impact on people.

MATERIALS: Pencil and paper (tape recorders optional).

ACTION: Each learner stands in front of his or her own house for an agreed-upon period of time (at least five minutes) and lists sounds heard and the number of times each sound was heard. (If tape recording equipment is available, the youngster could tape the sounds at the same time. Listen to the tape. Do you pick up sounds you missed at first?)

Each learner brings his data to the group for sharing. If desired, the information can all be compiled on a chart as follows:

Type of Neighborhood	Source of Sound	Frequency
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

How many different kinds of noises were heard by the group? How many noises were related directly to people? What noises were caused by cars, machines, etc.? How many noises were from animals? Do different neighborhoods have different sounds? (If you have tapes, can you identify a neighborhood by its sounds?) Where people had sounds that were about the same, were they in the same area? Is it better to have some sounds in certain areas and not in others? Did you like any of the sounds you heard? Why? Did you dislike any of the sounds you heard? Why? Were there any sounds that hurt or made you feel uncomfortable?

REFERENCE: Project KARE (ED 157 682)

TITLE: Snow Test

PURPOSE: To have the learner investigate the relative amounts of sulphates and chlorides in the atmosphere of his/her community, and to compare it with the situation in another community.

MATERIALS: Filter paper, balance, 5 one-liter beakers, 10 ml. of 1N $BaCl_2$ (industrial barium chloride), 1.0 ml. of 1N $AgNO_3$ (industrial silver nitrate), two copies per learner of the instructions below, writing paper and stamp.

ACTION: Involve the group through the following questions: How pollution-free is the air in our township? Is the air cleaner than most? Is there still cause for concern? What other places could we compare data with? How might we obtain data from these other locations? Is there a way to measure air pollution without expensive equipment?

Introduce the group to the fact that snow is a good trap for air pollutants as it falls through the atmosphere. Give them two copies of the instructions for testing snow for sulphates and chlorides. One copy is for them, the other to be sent to a "pen pal" in another community. Each person is to write a letter enlisting the cooperation of a learner elsewhere in providing similar data to be shared and compared.

SPECIFIC INSTRUCTIONS:

(1) Collect 5 liters of snow and melt. Filter, dry, weigh to determine particulate matter (soot, fly ash, etc.). Save filtrate.

(2) Boil the remaining filtrate until a volume of 20 ml. remains. Divide this into two 10 ml. parts.

(3) In order to determine the mass of sulphate materials resulting from pollution, complete the following:

a. Add 10 ml. of 1N $BaCl_2$ to 10 ml. from step (2).
b. Weigh a piece of filter paper and record its mass.
c. Filter the residue (if any) from step 3a. Wash in 5 ml. distilled water.
d. Dry filter paper and residue at 100°C.
e. Determine mass of filter paper and residue when cool.
f. Subtract the mass of filter paper (step 3b) from the mass of the dried filter paper and residue (step 3a) in order to obtain the mass of sulphate materials found in 2.5 liters of snow.

(4) In order to determine the mass of chloride materials resulting from pollution, complete the following:

a. Add 1.0 ml. of 1N $AgNO_3$ to the other 10 ml. of filtrate.

b. Continue this portion of the investigation as you did with steps 3b, c, d, e and f, but finding this time the mass of chloride materials found in 2.5 liters of snow.

(5) Gather data and mail results and thanks to all participants. Go back and reexamine the lead-in questions. Do you now have data that helps give more specific answers to the questions? Was it easy or difficult to get cooperation from other areas?

REFERENCE: Project KARE (ED 157 682)

TITLE: Energy Hunt

PURPOSE: Energy is today a household word. This activity will help learners discover concrete examples of natural energy at work, the changes it makes, and the forms it takes.

MATERIALS: Notebooks, pen/pencil.

ACTION: Energy is what gets things done. Although you can't find energy itself, you can observe the results of energy. It is all about us, so much so that we take it for granted. The purpose of this activity is to heighten people's awareness of energy.

There are two major categories of energy--potential and kinetic. Potential energy is stored energy such as the chemical energy of foods, wood, coal, oil, etc.; electrical such as batteries; and gravitational, such as a dammed pond, a rock on a cliff, or a tree ready to fall. Kinetic energy is energy in action: a fire, a moving car, a waterfall, the wind, etc.

The energy hunt will look for consequences of kinetic energy such as ridges in the sand caused by wind or tide, and the similar ridges and dunes in the snow caused by blowing snow; heat caused by the decay in a log; a bird or insect bucking the wind; a puddle evaporating by solar energy; cracked rocks due to the physical energy of expanding ice; a car engine running; and many, many more.

On the hunt each person should find an example of energy in action and explain his/her find to the others. Have the group keep a list. How many different examples did you find? Can you group them into headings such as mechanical energy, electrical energy, chemical energy, solar (radiant) energy? Did you find examples of change from one form to another?

TITLE: Stormtrackers

PURPOSE: For learners to gain familiarity with local geography and weather patterns, and develop some skills in local weather prediction.

MATERIALS: Topographic map of area, compass, watch with second hand.

ACTION: Summer thunderstorms are often of local origin and may show various local patterns. By careful observations, each storm can be plotted, mapped, and the patterns detected. Often if the storm approaches a local hill in a certain way, it will be deflected away from or toward certain local areas. You can figure these out and do your own local predicting.

Sound travels at 1100 feet per second. When you see a flash of lightning, begin counting seconds until you hear the thunder. The thunder is caused at the time of the lightning flash, but light travels faster than sound.

If you count ten seconds between flash and rumble, the sound traveled about 11,000 feet, or about two miles. By making this calculation every 4 or 5 minutes, you can plot out whether a particular storm is approaching or retreating. By plotting each storm on the topographic map and noting its directional movement, you can determine if any geographical features affect local storms as attractors or deflectors--features like a notch in the hills, a river valley, etc. After a while you will be able to tell by a storm's position whether it is likely to hit where you are located, and about how much time you have before a storm hits.

TITLE: Sauntering Soil

PURPOSE: For learners to discover how soil moves about, for better or for worse.

MATERIALS: Hand lens, soil auger, small jars (baby food) and lids, watch with second hand, pint pitcher, #10 can with both ends out.

ACTION: This is really a multi-part activity. Parts 1 and 2 deal with a soil's ability to absorb water, the others with the movement of soil.

(1) Choose an area where grass grows, a bare area, and a heavily trampled area. At each site push a #10 can without ends into the ground. Pour in one pint of water and record time it takes for all the water to soak in.

Which areas soak water in fastest? Which would water stand on or run off?

(2) Take samples of soil from your different test sites. Fill small jars half full of soil. Fill rest of jar with water. Secure cap and shake thoroughly. Let the sample settle for half an hour or so. Notice the layers of different size particles. Can you discover any correlation between the amount of certain particle sizes and the soil's ability to absorb water in #1?

(3) Check gutters. Can you find any soil? If yes, can you find out where it is coming from? How far it moved? What moves the soil?

(4) Using a soil auger, sample the top of a hill and the foot of the hill. Carefully measure the dark layer of top-soil. Is it thicker, thinner, or the same at top as the bottom? Is this relationship the same for hills that have been farmed for many years as with hills that have been covered with undisturbed vegetation?

(5) Can you devise ways to keep the soil from traveling any great distance? Try to reduce soil erosion (traveling) on an embankment of a yard or roadway.

TITLE: Soil Seeker

PURPOSE: To gain familiarity with the variety of soils in the local community and values of those soils.

MATERIALS: Heavy paper, rubber cement, soil auger, map, local soil scientist.

ACTION: Soil is formed in layers which soil scientists call horizons. Each layer is usually a distinctive color and has a slightly different make-up than adjacent layers. Each horizon differs in thickness from the others. The sequence of horizons of differing thicknesses constitutes a particular soil's profile. Soils differ according to the slope of the land, the underlying bedrock, the amount of rainfall. Most communities have more than one soil type.

Seek and collect soil micro-monoliths of the soils in your community (a micro-monolith is a sample of each of the layers of the profile of the soil).

For each soil you sample, bore down until you reach bedrock or gravel. Note the width of each layer and draw a vertical line to scale for the total depth and proportionally mark off each layer with a horizontal line. Within each layer put a stripe of rubber cement. Press a sample of soil from that layer onto the rubber cement and let dry. When finished you will have a micro-monolith of that soil. Be sure to record the exact location of the soil and pertinent conditions of slope, wetness, etc.

Once you have collected a representative sample of all the soil types you can find in your community, invite your local Soil Conservation Service to send a representative to meet with your group and help you identify your soil types and tell you about the strengths and limitations of those soil types for such things as septic systems, building construction, farming, etc.

TITLE: This Is Your Life, Rollin' River

PURPOSE: To have learners gather and analyze data about a local brook, stream, creek or river and to discover the value of that water body to the community as well as to develop a concern for its future.

MATERIALS: Regional map, local topographic map, field guides or keys to local aquatic life, pH kit, B.O.D. test kit, thermometers, cameras.

ACTION: In a group meeting have the learners identify a body of flowing water in the community that they would like to explore in detail and describe in detail to others. Then set about through field studies to get as much information as possible. Use the outline below as a questioning guide but don't hesitate to add questions of your own for study.

(1) Where does your stream actually start? If no one knows, trace it on the regional map. If possible, visit the site and describe the birthplace (spring, marsh, pond, glacier).

(2) What happens to this stream as it flows to join a larger body of water or the sea (speeds up, slows down, V-shaped valley, U-shaped valley, meanders, becomes polluted)?

(3) Where are most of the towns located on the stream (near the beginning, where it enters another body of water, fairly evenly along the way)?

(4) What happens to the stream as it runs through your town? Are any materials added to it? Does its temperature change? What materials will be taken away?

(5) Develop a simple poem based on your sensory perception of your stream.

With one word describe how it smells. _____
With two words describe how it looks. _____ _____
With three words describe how it feels. _____ _____ _____
With two words describe how it tastes (if safe) _____ _____
With one word describe how it sounds. _____

(6) What plants and animals do you find living in the water?

Organism: name, describe, sketch	Location: edge, middle, etc.

(7) The plants and animals have needs for certain kinds of chemical conditions. Test the water regularly for pH, oxygen and others (nitrogen, phosphorous, etc.) if you have the equipment. Can you discover any patterns of correlation between your chemical findings and the kind and distribution of organisms?

(8) Do you find the same type of man-made addition to the stream above your community as below it?

(9) What places along your stream did you like best? Why?

(10) How do you think your stream has changed in the last 50 years? You might interview some local old-timers (see Appendix A, p. 181, "Community Interviews").

(11) What is the future for your stream? Is it likely to deteriorate further or become more like the past? What human involvements with the stream must change to stop deterioration or reverse it?

You may wish to take many pictures of your stream exploration and prepare a "This Is Your Life" bulletin board exhibit or slide show to give other townspeople a closer look at a stream that really belongs to everyone.

REFERENCE: Lib Roller. Using the School and Community: An Environmental Study Area (ED 071 917)

Section III

The Built Environs

People are distinguished by their capacity to use their brains and hands to alter the physical and biological environment and create structures for living in and transporting materials about. It is these structures and their design that are the focus of activities in this section.

We can design structures that meet our needs and minimally disrupt the ecosystem for us and other life forms, or we can design structures that are very disruptive and potentially threatening to the long-range security of both humans and other life forms.

We all need to study the built environs more carefully, in the best interests of us all.

TITLE: Aluminum Foil Corrosion Test For Air Pollution

PURPOSE: To help individuals recognize some of the visible effects of air pollution and identify any problem areas.

MATERIALS: Glass jars, coat hangers, cheesecloth--one each per site. Aluminum foil strips--two per site. Staples.

ACTION: Choose several sites (four or more) around your neighborhood, school or community.

Place two aluminum foil strips at each site, one exposed to the air and one enclosed in a glass jar.

Stretch cheesecloth over coat hangers and staple to make a particulate collector. Hang one at each site.

Group will observe test panels each week. At the end of a 12-16 week period, compare test panels visually to determine:

a. Which areas have the most corrosion?
b. Which areas have the most particulate matter?
c. Do you think the particulate matter is corrosive?
d. What could the source of corrosion be?
e. Do you think that amount of corrosion or particulate matter is a problem?

ADDITIONAL ACTIVITIES: Try putting a piece of cheesecloth over a car exhaust pipe. Test corrosive effects on copper, tin, paint or iron.

TITLE: Mental Maps

PURPOSE: To discover the many different ways people perceptualize the world about them. A professionally prepared map is an abstract representation of a section of the earth's surface with certain desired elements emphasized and less important elements eliminated. A mental map is such an abstract representation in an individual's mind. Each person has a different map of his or her community, depending on his or her experiences and what that person considers important. A person's mental map of a familiar area, not surprisingly, is very different from that of an unfamiliar area.

MATERIALS: Paper and pencil.

ACTION: Choose an area of your community to be studied. It should be an area with which most people are fairly familiar, i.e., downtown area, local shopping area, the local neighborhood, or the entire town if it is small enough.

Ask each learner to sketch from memory a map of the study area. Have them label what they consider key landmarks and major streets. (For this part of the activity, learners should not share information.)

Have the group put the maps up around the room. Let everybody see all the others. Then lead a discussion of how the maps are similar and how they are different. If you wish, you can make a chart showing how frequently certain elements show up in the total number of maps.

Have the learners take some paper home and have one or both parents or guardians do the same exercise. Have learners bring the maps to the next meeting and compare them with their own. How are the adults' maps the same? Different? Do they use different reference points? Do adults and youngsters live in different worlds in the same community?

Notes: To keep things as comparable as possible, it is useful to write out instructions so that all people doing the exercise are using the same instructions. There should be no answering of questions about the mapping exercise until the maps are drawn.

This exercise can be built into a study by getting people of different segments of the city (class, ethnic, etc.) to draw such maps and see the differing ways in which segments of the community perceive the community.

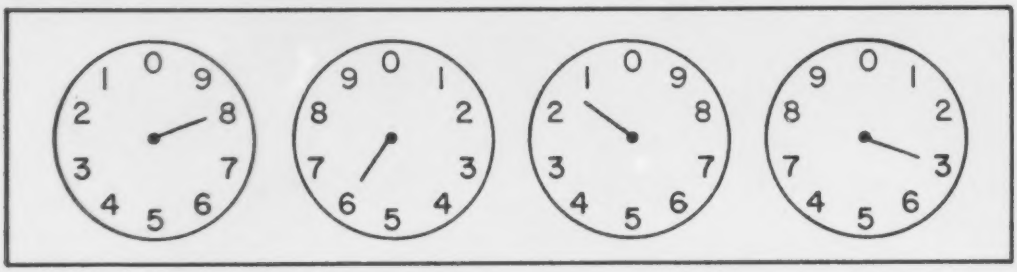
REFERENCE: A Guide to Urban Studies, edited by William Andrews.

TITLE: Home Energy Use Monitoring

PURPOSE: To learn how to read the home electric meter and learn how to use the readings to discover the family's energy use patterns.

MATERIALS: Pencil, paper, home electric meter.

ACTION: Locate the electric meter in your home. Write down the numbers on the four dials reading from left to right:



Write down the number the pointer points to. If pointer is between two numbers, record the smaller of the two numbers. You should read the meter above as 8 6 1 3.

Your first reading will be your BASE READING or starting point. Enter it at the first reading spot on the chart. Keep the chart for a week trying to record the information at the same time each day so you will know the amount of electricity used in a 24-hour period. Keep notes on days when the family is using a lot of electricity (doing a lot of laundry, running an air conditioner, etc.). How does this affect the 24-hour reading on that day compared to others?

Here is a suggested chart:

CHART			DIFFERENCE NOTED	
1st Reading	(time, date)	_____		
2nd Reading	" "	_____	1st day*	_____
3rd Reading	" "	_____	2nd day	_____
4th Reading	" "	_____	3rd day	_____
5th Reading	" "	_____	4th day	_____
6th Reading	" "	_____	5th day	_____
7th Reading	" "	_____	6th day	_____
8th Reading	" "	_____	7th day	_____

Subtract 1st reading from 2nd reading to get first day results. Subtract 2nd reading from 3rd reading to get 2nd day results, etc.

Notes: The meter records the flow of electricity. The more electricity you use, the more the electricity flows and the more the dials turn. A 100-watt bulb uses 100 watts if it burns one hour or 100 watt-hours. As the dial turns, it represents fractions of watt-hours. Watt-hours are actually small units so the electric company uses a larger unit--the Kilowatt-hour (1000 watt-hours)--for its records to keep the numbers manageable.

The leader can turn this into a group activity by setting up a challenge. After each learner has recorded the family energy use for a week and determined average daily usage, have the families compete to see which one can decrease their electrical usage the most in the next week.

TITLE: Microclimates in a High-Rise Area

PURPOSE: To discover that changes in the microclimates occur in built environments as well as natural environments, and the implications these microclimates have on living in the area.

MATERIALS: Tape measure, 2 thermometers, 2 wind speed indicators, 2 wet- and dry-bulb hygrometers (for humidity readings).

ACTION: All can be done by an individual over time but the directions offered here are based on doing the activity with the group.

Divide the group into two teams.. One will survey the effect of the height of the buildings on microclimate, while the other team studies the ecological effects of the high-rise on the neighborhood.

Team A: Obtain permission from residents of apartments where you wish to conduct tests. Choice of apartments will depend upon the size of the building, but you should include apartments facing in different directions and at intervals of five to seven stories. Clearly it is preferable to have learners who live in the apartments make the arrangements, but if this is not possible, seek the aid of the building supervisor.

For each apartment, record readings of temperature, relative humidity, wind speed, and wind direction outside a window, or preferably on a balcony. Note the time of day and the intensity and duration of sunshine (a photographic light meter is an optional piece of equipment that could help give specific readings). Ask the resident to estimate the time of day when peak periods of sun and/or temperature normally occur.

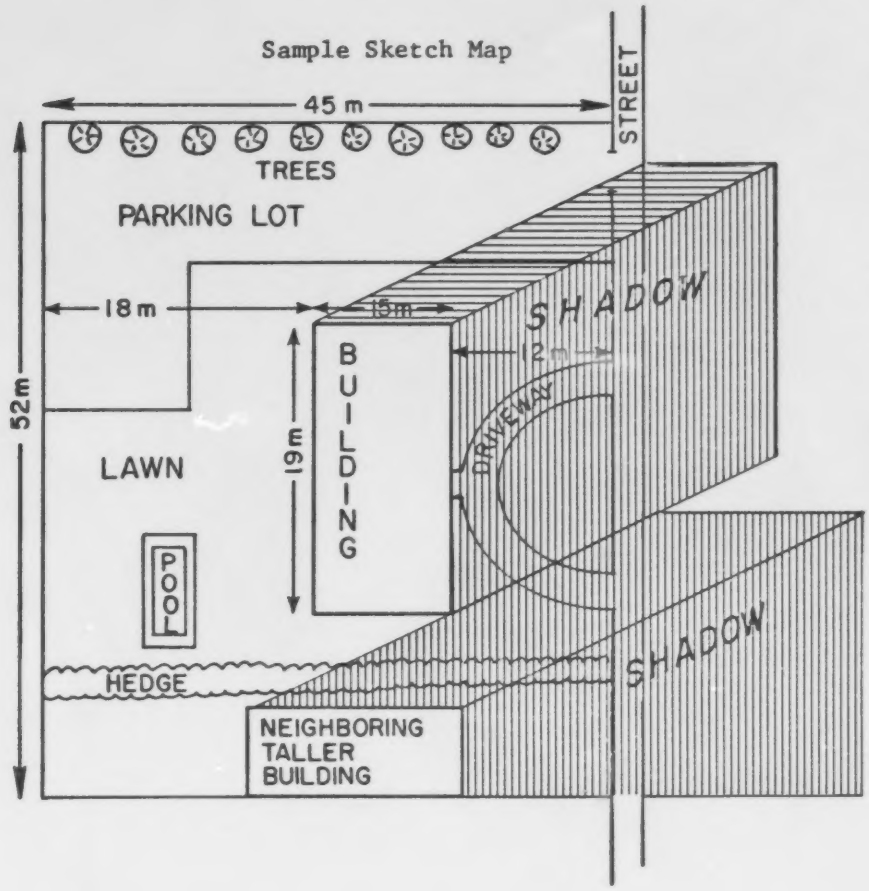
Also ask the residents if they have noted any bird or insect life at their windows or balconies and if so, if they can describe it.

Team B: Make a sketch map of the area similar to the one included herein. Measure the dimensions of shadows, buildings and property; add these to your diagram.

Measure temperature, light intensity, relative humidity, wind speed and wind direction from the ground in the parking lot, under some trees, in an open grassy area and in other areas where you suspect you will get different results. Record all data on the diagram or on a separate data sheet.

You may want to gather information also on effects of these microclimates. In summer compare the density of grass cover close to the building to growth 100 to 200 meters from the building. In winter compare depth of snow cover.

Discuss with the group how much variation does occur around the building and at different heights. What effects does the building's shadow have on the area? Can you account for the variations in climatic readings?



REFERENCE: A Guide to Urban Studies, edited by William Andrews.

TITLE: Wall-eyed

PURPOSE: To develop awareness of the variety of walls in our lives and their effect in defining spaces.

MATERIALS: Notebook and pencil.

ACTION: Take a walking tour of the neighborhood and make a listing of all the walls you see and what they are made of. Jot down what the walls do, i.e., control temperature, control light, control sound, give privacy, protect people and things, etc.

Are there places in the neighborhood where walls are needed but are missing? What kind of a wall would you suggest? What walls in the neighborhood would you tear down? What are your reasons?

After-trip scavenger hunt: How many of the following did the group see?

- a plaster wall
- a glass wall
- a clapboard wall
- a mosaic wall
- a concrete wall
- a stucco wall
- a brick wall
- a thermal glass wall
- an insulated wall
- a stone wall
- a hedgewall
- a wall with a mural on it
- a cyclone fence wall (add others, too)

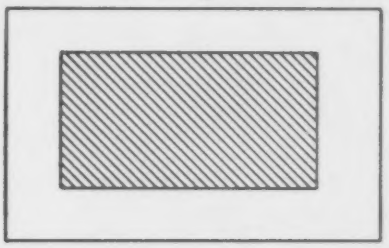
Read to the group Robert Frost's poem, "Mending Walls." Discuss with the group how walls in the neighborhood can make it both attractive and safe to live in.

TITLE: Color Me Blue

PURPOSE: To explore how color in our environment shapes our moods and thus how color can be important in designing our immediate environment.

MATERIALS: Colored construction paper, glue.

ACTION: Have the learners make up a series of a dozen or more color cards using different combinations of the construction paper. Also have some with only single colors.



Conduct a color use survey with these cards, first among the group and then among outsiders. Develop a chart for recording their answers. Ask the questions: 1) What one word does this color or color combination make you think of? 2) What things would you paint in this color combination?

After you have a good collection of answers, share the information with the whole group. Did a number of learners come up with the same words and uses for certain colors? Which ones?

What colors seem to make people:

a. cool
b. warm
c. sad
d. cheerful

If the group could paint their meeting place any color combination, what would they paint it and why?

ADDITIONAL NOTES: Perhaps a local interior decorator would visit the group and share with them how he or she uses color in designing people's personal environments.

TITLE: There Ought To Be A Law

PURPOSE: To help learners verbalize their values and express their opinions on what kind of a neighborhood and world they would like.

MATERIALS: Paper and pencil or large sheets of newsprint and magic markers.

ACTION: Choose a neighborhood in the community for a walking trip. Have each learner develop a list of things they like and dislike about the neighborhood. Are buildings too high, too low, too close, too far apart, too run-down, too garishly colored, etc.?

After the walk is over, have the learners share their lists. (Or, you may want to develop a combined list on large sheets of newsprint. You will end up with three columns, as follows: EVERYONE LIKES, EVERYONE DISLIKES, and SOME LIKE-SOME DON'T.)

Then propose laws or ordinances that might help stop the development of things we don't like, i.e., houses should be no closer than 30 feet from the road; only trees that grow no taller than 20 feet should be planted along the street under power lines, etc.

Learners with deeper interests may want to get a copy of local zoning rules to see if any of the proposed rules are already on the books. If they are, did you find any zoning violations?

The group might want to meet with a member of the zoning board or planning board to find out how that group goes about proposing rules, perhaps sharing the group's proposed "laws" with that person.

TITLE: Energy Resources

PURPOSE: Maintenance of adequate energy resources is essential to an industrial society. Our fossil fuels are being consumed at a tremendous rate. This activity should help your group realize that environmental problems are solved only through continued research; it will make them more aware of energy problems and give them a chance to consider the alternatives.

ACTION: Visit a coal dealer and obtain samples of the different kinds of coal that he supplies. Find the service, cost, and use of each kind.*

Prepare an electric quiz board to match various types of coal with various energy and other uses.

Find out what the major sources of energy are in your area and prepare an exhibit of them. Show what resources are involved and whether or not they are in danger of depletion.

Have students visit their local filling station. They should obtain the name and address of the company from which it receives oil and gas products. Have a representative of the group write for literature on the source, refining, and distribution of oils and gas by that company.

Solve the following mathematical problem:

> It is estimated that 250 million tons of coal are wasted annually through incomplete combustion. What is this worth at the price you pay for coal in your community?

What are the benefits of using coal, gas, and oil as energy sources? What are the major problems associated with each type?

What are the alternatives to these traditional sources of energy which are available today? What are the problems associated with each?

> *If a visit is not possible, you can obtain samples of peak, lignite, and bituminous and anthracite coal from: The Bituminous Coal Institute, Washington, D.C.

REFERENCE: Electric Learning Activity (p. 41)

FOLLOW UP: Visit a Nuclear Power Plant in your area. List the advantages and disadvantages of nuclear power. What are the problems of nuclear waste, radiation, or possible hijacking of nuclear fuels?

Visit a home that is heated mainly by solar energy. What are the advantages and disadvantages of solar energy?

TITLE: Exhaust-ing

PURPOSE: To discover how engines contribute to air pollution.

MATERIALS: Clean white cloths, collection papers smeared with petroleum jelly, or facial tissues or waxed paper attached to cardboard; cars, trucks, lawnmowers, any internal combustion engine; watch; meter stick; magnifying glass; poster paper and cardboard; angel hair, glass wool, or polyester fiberglass used for aquarium filtration; burn ointment (for emergency use), cardboard tubing.

ACTION: Use about a dozen of the above suggested papers or cloths. Hold the collector paper parallel to the mouth of the exhaust pipe of the vehicle while it is running. Keep it at a distance of about 15 cm. from the mouth of the exhaust for about two minutes.*

Test many cars, trucks, lawnmowers, mopeds, motorcycles, snowmobiles, etc. Label each collector paper as to engine year, type, number of cylinders, type of fuel burned, etc. Record your observations of the particles such as color, size, texture, etc. Mount the collector papers on posters in serial order from the exhaust with the most particulate matter to the least. (You may wish to exhibit this somewhere to educate others.)

Some questions for discussion:

What variables were kept constant on your experiments? Would better results have been obtained using a different type of collector? Why, or why not?

Did you find any relationships of significance--such as the amount of solid particulate matter and the age of the engine?

What other relationships might there be? How can you test to see if you are right?

Can you make an air filter from cardboard tubing and angel hair? How can you test how well it works? How often would it have to be changed to be effective?

*SAFETY NOTE: Obtain the owner's permission BEFORE starting the engine. Keep your face as far from the exhaust as you can while working. Don't touch the exhaust pipe; it could cause burns. Don't run the engine in a closed garage.

REFERENCE: Gerald H. Krockover, "Pollution Studies."

TITLE: Drifters

PURPOSE: To help learners discover some of the materials that are drifting about in the air we breathe.

MATERIALS: Pieces of waxed paper 6 cm. (around 2-1/2 inches) square, pencil and ruler, boards and thumbtacks, petroleum jelly, magnifying glass, paper.

ACTION: Use pencil and ruler to mark the waxed paper square so it is divided into one centimeter squares (around 3/8-inch squares). Attach the paper to a piece of board with thumbtacks. Smear the paper evenly with petroleum jelly. Place the boards in various locations outside in the community for about a week.

Collect your collection boards and examine the paper closely with a magnifying glass. Choose a square and count how many different types of material you see. Select other squares and do the same; compare them. Place your observations on a chart or graph. Compare the results from different sites.

What was the most common type of material present? Which types may have come from industry? from homes? from nature? What does the number of particles in a particular square indicate about the amount of air pollution in that location?

REFERENCE: Gerald H. Krockover, "Pollution Studies."

TITLE: Assessing Solid Waste Problems

PURPOSE: To help the learner develop awareness and concern about solid waste disposal problems in the community.

MATERIALS: Paper and pencil, transportation, waste collection schedule for homes and businesses. (This should be available from the sanitary engineer, health department, or private haulers).

ACTION: Using the garbage and trash disposal schedule, determine dates of collection in areas of the community you wish to study. Make a route-of-investigation schedule for the purpose of arranging visits throughout the community (or have the learners present a descriptive narrative of their neighborhood).

Divide the survey group into divisions of concentration. Such areas might deal with the following questions:

(1) What is the average number of cans or bags of garbage per street?
(2) What kind of solid wastes are observable?
(3) At what location on each parcel of land is the rubbish placed for pick-up?
(4) How well does the rubbish appear to be packaged?
(5) How are waste materials dealt with at places of business and industry?
(6) What is the appearance of the general area of the community on the day of collection?
(7) What kinds of vehicles are used to place waste for pick-up?
(8) What kinds of vehicles are used for transfer or removal?
(9) Who are the sanitary engineers, and what are their job responsibilities?
(10) What is the noise level during pick-up and transfer?
(11) What is the neatness level after pick-up and transfer?
(12) Where is the waste material taken and how is it finally disposed of?

Record information on data sheets and then have the group meet to discuss what they have discovered. Make a list of recommendations that might improve any problem areas and present or direct it to elected officials in the community.

REFERENCE: Center for the Development of Environmental Curriculum (ED 099 230)

TITLE: Not Nature's Own

PURPOSE: To increase learner's awareness of the increasing number of synthetic materials in our environment, their abundance and impact on natural systems.

MATERIALS: Poster board, markers and other materials for making a display; library.

ACTION: Have the learners go out into the community and collect as many man-made materials as they can. Make sure that a distinction is made between synthesized and processed materials or you will be up to your eye teeth in materials. Some examples might be:

styrofoam cups	herbicides
plastics of all kinds	detergents
synthetic rubber	nylon
pesticides	

Research each of the items. Is each biodegradable? What are its breakdown products? Are they toxic to any living things? Through your own study determine how abundant these materials are in your local community. What nonrenewable resources are required to make them?

Prepare an exhibit of these materials and the information you have gathered to better inform others of your community. Arrange for the exhibit to be shown in the local library, bank, or store window, or other prominent place.

NOTE: It is a fact of organic chemistry that living things have produced a rather limited variety of organic molecules necessary for life processes out of the vast chemical possibilities that there are. It would appear that there is good reason for this, particularly if life is viewed as a result of a good deal of trial-and-error experimentation. Furthermore, almost all of the products of living activity have some counterparts in nature capable of breaking them down, a characteristic which is known as biodegradability.

Man-made products, however, more often than not do not have such counterparts, with the result that these products often accumulate with harmful effects, or even with depleting and offensive effects.

REFERENCE: Center for the Development of Environmental Curriculum (ED 099 230)

TITLE: Sherlock Heatloss

PURPOSE: To help learners develop a skill at determining energy loss in homes in the community.

MATERIALS: Thermometers, list of R factors* for common materials (available at hardware stores, heating companies, or books dealing with energy systems), yardsticks or measuring tapes.

*R factors are ratings of a substance's ability to retard heat loss.

ACTION: Individuals or teams of two or three armed with thermometers and R factor lists explore various materials found in their homes--substances such as wood, glass, metal, brick or concrete block. (You could also explore snow houses.)

(1) Determine the material you plan to test and its approximate thickness. (R factors generally change with thickness).

(2) The learners take temperature readings outside and just inside the test area. The other measurement needed is the number of square feet of the test material in the room or house. With these data it is now possible to determine how many BTU's of energy are being lost through that material.

(3) By plugging their data into the accompanying formula and doing the arithmetic, the BTU's lost per square foot per hour can be determined. Multiply this by the total number of square feet of the material to discover the approximate total heat loss.

$$U(\text{Btu's/hr/ft}^2) = \frac{\text{Ft}^2 \times \text{temperature difference } (^{\circ}\text{F})}{\text{R Factor}}$$

(4) Find the cost of a million BTU's in your area from your local power company. Determine the cost of the heat loss per day from your test material or a combination of such materials found in your house.

NOTE: This activity is useful in preparing for the Energy Knights activity, page 165.

REFERENCE: John Dolson, "Environmentally Educated."

TITLE: Goo-go

PURPOSE: To help learners work through a real problem in miniature and to gain empathy for the task facing those who must clean up miles of polluted beach or clean oiled birds.

MATERIALS: Screw-top jars, dirty crankcase oil (from a local service station), sand, chicken feathers (an old feather pillow is a good source), list of materials generally used to rid oil from sand and feathers, supply of these materials.

ACTION: Hand out jars of sand and oil mixed (close jars tightly and mix them thoroughly) and feathers coated with oil. The leader establishes the problem with the learners: "What you have here in miniature is a polluted beach or an oiled bird. Your task is to clean your sample up. When you hand back the cleaned up sample, attach a list of the materials and methods you used to rid the sand or feathers of oil."

When the individuals or groups complete their investigation (perhaps the material is best handed out at the end of a session for exploration between sessions and discussion at following session), discuss the following questions, among others: How much time did it take you to do the cleaning? Would it be easier or harder to clean up a whole beach or bird? What would be the impact of your clean-up technique on the environment?

RELATED ACTIVITY: Pencil, paper, several boxes of puffed cereal or a good supply of popcorn, are the materials needed.

This activity can be held at a site chosen as a likely place for an oil spill (roadside pond or marsh, lakeshore, ocean beach). Cast out your supply of puffed cereal or popcorn. Both are biodegradable and won't harm the environment. This material stimulates the floating oil. After a few minutes begin to map where the material goes in the area. How difficult would it be to contain your "oil spill" at this site? About how long a time span would you have before the spill was out of control? What effect would the clean-up technique you used in the previous activity have on this habitat?

REFERENCE: Michael B. Leyden, cited in "Science and Teachers," Science and Children, November 1973, p. 2; OBIS, Lawrence Hall of Science.

TITLE: Wastewater Treatment

PURPOSE: To provide the learner with an understanding of the processes we must use to remove dangerous materials from used water before returning it to the environment.

MATERIALS: Transportation flowchart of the local wastewater treatment plant (available from the local plant superintendent).

ACTION: Conduct a field trip to the local wastewater treatment plant. Arrange to have the superintendent or one of his workers explain how the plant works and the various stages of treatment. Develop a checklist of questions with the learners. Share this with the superintendent so he or she can be prepared with the answers.

Questions might include:

- What are the major materials that have to be removed from the water?
- What are the major sources of these materials?
- What are the primary, secondary and tertiary treatments and which is used here?
- What do you do with the material (sludge) that you remove from the water?
- What kind of career opportunities are there in wastewater treatment?

ADDITIONAL ACTIVITY: For communities using septic systems only:

Invite a member of the Board of Health to talk to the group about how the septic system works. Ask them to explain how the septic system works. Ask them to explain what kinds of household materials or chemicals foul up a septic system and why. What is a "perc test"? How does it affect use of land for building? How do septic systems affect groundwater supplies?

TITLE: Feeling Fuelish

PURPOSE: To build awareness of the variety of fuel sources and their abundance in your locality.

ACTION: Survey a neighborhood and find out what types of energy sources are used for home heating:

- gas
- oil
- solar
- coal
- wood
- electricity

What percent of the homes heat with each of the fuels? Electricity is not a fuel, but is made in most cases by burning any of several fuels. Visit your nearest electrical generating plant. What fuel(s) does it use?

Ask a local oil dealer to speak to your group. Where do most of his oil supplies come from?

Visit a local coal dealer, if there is one near your community.* What kinds of coal does he handle? Where does each of these come from?

Ask the people with wood stoves or furnaces where they get most of their wood supply.

Visit the local gas company if possible to find out how gas is supplied to your region and from where. Does the local company use LNG (liquefied natural gas)? If so, do they make their own or buy from elsewhere?

SPECIAL NOTE: Children should be aware that some of the places to visit are somewhat hazardous due to industrial machinery. They should be well-briefed in staying together and not leaving the group or the prescribed path.

As follow-up you may wish to prepare an exhibit on community fuel use, geographical sources of supply and samples of appropriate fuels to put in local commercial establishments or the local library.

*If a visit is not possible, you can obtain samples of peat, lignite, and bituminous and anthracite coal from the Bituminous Coal Institute, Washington, D.C.

SECTION IV

The Social Environs

Other people are a major element of our environment. Our understanding of and concern for others and theirs for us affect in large measure the psychological environment in which we live.

The wants and desires of all of us have impacts in the environment through our respective lifestyles. How much we consume of materials and energy, where the resources for such consumption come from, and who profits and who loses from our activity have broad, infusive, and far-reaching impacts on our planet both locally and globally. Activities in this section concern exploration in this arena.

TITLE: Model Opinionnaire--Opinions on Littering

PURPOSE: The Opinionnaire is a widely used survey vehicle designed to determine what peoples' opinions are on a particular question or issue. This technique will help your group identify environmental issues and differing value positions that affect an issue, develop skills in recording and communicating data, and to make inferences based on the data and recommendations based on data and ecological principles.

ACTION: Note to leaders: This is a model opinionnaire. Your learners may prefer to make up their own based on other issues in their community. The following rules should be discussed before making up your opinionnaire:

1. Carefully decide the exact information to be collected.
2. Specify the exact geographic area in which data are to be collected.
3. Collect enough data to make sure the information is truly representative of the problem in question.
4. Record all data carefully and completely.
5. Work out a system that will accurately communicate the data to others, e.g., charts, graphs, tables.
6. Make sure that all conclusions, inferences and recommendations are substantiated by the data collected.
7. Members should be prepared concerning the basic rules of courtesy and understand that there are people who resent being asked such questions and may be rude to them when asked the questions.

This opinionnaire is designed to collect citizens' opinions and concerns about certain aspects of littering. It is suggested that samples be taken from several segments of the population, i.e., junior high students, high school students, people aged 20-30, and people over 30. It should be read to the persons being surveyed. A minimum of 25 persons per sample is recommended.

In order to summarize the results of your opinionnaire, make up a summary sheet as follows:

	Yes	No	Undecided	Males	Females	Totals
Question 1						
Question 2						
Question 3						
etc.						

Use different summary sheets for each age group.

For evaluation, consider the following questions:

A. Are those values expressed by citizens consistent across the populations which were sampled? Why is this the case, or why not?

B. Do you believe that different opinions should be shaped concerning littering in your community?

C. If a problem exists in your community, what recommendations could you pose for helping resolve the problem? Do you believe this problem could be solved with one single action or a combination of actions?

MODEL OPINIONNAIRE

Introduction: Hello, my name is _____. I am a member of the (class or group name) in (name of community). We are collecting information about how people feel about littering (or other issue).

Initial Data:

Sex: M__ F__

Age: _____ Jr. High
_____ Sr. High
_____ 20-30
_____ Over 30

Questions: Answer Yes, No or Undecided.

Yes	No	Und	
☐	☐	☐	1. Do you consider the littering of public and private property to be a problem in this community?
☐	☐	☐	2. In your opinion, does littering have any ill effects on the beauty or aesthetic quality of this community?
☐	☐	☐	3. Does littering have any public health impact on the community?
☐	☐	☐	4. In your opinion, does litter clean-up cost this community much money?

5. In which of the following places in the community do you think littering is at its worst:

____ schools
____ public streets
____ shopping areas
____ private property
____ gas station, drive-ins
____ other

6. What age persons do you believe are the most responsible for littering?

____ Junior high
____ Junior high and senior high
____ College age
____ Over 21

7. Which of the following would you be willing to throw away on public or private property?

____ Cardboard box full of empty cans or bottles
____ A sack of wastepaper from a drive-in
____ One empty bottle or can
____ A paper soft-drink container
____ A wrapping from gum or candy
____ None of these

8. Which of the following statements concerning law enforcement do you agree with most?

____ Law enforcement officers should ignore people who litter.
____ Law enforcement officers should enforce anti-littering laws only in cases of extreme or severe littering.
____ Law enforcement officers should enforce anti-littering strictly to the letter of the law.

☐ ☐ ☐ 9. Would you ever consider reporting a severe case of littering to the police?

☐ ☐ ☐ 10. Have you ever reported a severe case of littering to the police?

☐ ☐ ☐ 11. Do you personally wish that fewer people would litter?

12. In your opinion, what is the most important reason for the litter problem as it exists today? (Record answer)

This is the end of our opinionnaire. Thank you very much for your help!

TITLE: From Out of the Past--Interviews with Old-timers

PURPOSE: To help learners find out about some of the rapid and large changes that have taken place in our society during the last 50 years, and to give learners a chance to better relate to and appreciate older people. The process helps bring history alive to learners.

MATERIALS: A tape recorder and tapes are valuable assets to this activity, although not essential. If tapes are not made, then notebooks and pencils will be needed to keep notes.

ACTION: Have the learners jot down a list of questions they have about how things were in the community in the past. Questions might include:

a. How different is our town or city from when you were a child?
b. What types of transportation were the most common?
c. Have food types changed much from your youth?
d. Did you grow much of your food or buy it?
e. What types of work-saving devices did your mother have in the house? How did she wash clothes, clean floors?
f. How was your house heated?
g. What did you do for entertainment before TV? What games did you play?
h. What did your family like to do when they got all together?
i. Where did people go to find work? What types of jobs were available within the community?
j. What do you consider was the biggest change in our community? What effects did that change have?
k. Did you ever see live chestnut trees with burrs? If so, do you know if any are still around today?
l. Did you ever see an animal alive that is extinct today?

Find out who some of the oldest longtime residents of the community are. Local ministers are usually a good source of names, as is an historical society. Arrange for two-person teams to visit some of these people and ask their questions. Note: Remind the teams to be polite, patient (particularly with those hard of hearing), and not to overstay their welcome for many elderly people tire easily.

After the teams have made their visits, have the learners meet and share their tape recordings or notes. Discuss the types and values of the changes in your community in the last 50 years.

Note: See Appendix A, p. 181.

TITLE: Getting There

PURPOSE: To compare various modes of transportation as to safety, efficiency, cost, etc. To gain information useful in making environmentally and economically sound travel decisions.

MATERIALS: Bicycle, motorcycle, automobile, public transit system, watches.

ACTION: Choose a route that represents a typical daily journey from a home to work or home to shopping center. The trip should be at least five miles.

Have one or more learners attempt the trip on each of the following transportation modes:

- walking
- bicycling
- public transportation--taxi, bus, rapid transit
- motorcycling
- automobile

This can be done by riding with others (car, motorcycle), as well as individually. Have the trip duplicate as much as possible actual real conditions. This is not a race.

Record the time needed for each trip, together with other details of the trip such as comfort, reliability, cost and safety. Prepare a chart like the following:

Origin of trip_____ Destination_____
Length of trip_____

Transportation Form	Time for Trip	Average Speed	Cost per trip*	Cost per mile or km.

*Be sure your costs include both direct (gasoline, parking) and indirect costs (insurance, depreciation).

Comments re: convenience, reliability, comfort_____

- Which form(s) of transportation is (are) most practical for the trip(s) tested?
- How important are the qualities of speed, convenience, cost, and safety in determining the choice of transportation?

- Does the availability of transportation facilities dictate the type of transportation used or does the demand for transportation facilities result in their development?

- What is the mechanism for transportation planning in your area? Is it efficient? Does it answer the needs of the community?

TITLE: Plotting Your Personal Orbit

PURPOSE: To develop overt awareness of the learner's orbit of use of the community in which he or she lives. If possible have individuals compare their orbits and develop appreciation of their similarities and differences with peers. Individual orbit reveals a great deal about the individual's relationship to the environment and provides knowledge that planners should use in designing communities.

MATERIALS: Detailed street maps of the community, notebook or diary.

ACTION: Keep a detailed record of all your movements outside your home or apartment for at least one week. Movements within an apartment building but outside your apartment should also be recorded. Record the following: time and date of trip, means of travel, destination-name and location (the nearest street intersection), purpose of trip (social, consumer, work, school, recreation), stops along the way and their purpose. It is preferable to keep the travel diary for two weeks.

Once you are fairly aware of your movements within the community, you can move to the second step:

a. Make a list of the activities you do at least once a week that require you to leave your home. You may classify these activities under general headings of social visits, consumer purchases, and recreation. The frequency with which you travel to each destination should be noted.

b. On the outline street map of your town or city, plot the locations of all the activities noted. Accuracy to the nearest street intersection is all that is necessary.

c. Join each destination to your home with a straight line. Different colored lines can be used to distinguish the frequency of visits, if you wish, e.g., daily, biweekly, weekly, etc.

d. Outline your orbit by joining your most distant destinations. You can construct daily, biweekly and weekly orbits if you wish.

Once you have outlined the orbit(s), you can see what pattern is revealed. What is its shape like? Does it extend farther in one direction than another? Why might this be? How does the size of your orbit compare with that of your friends? With that of your parents? What factors seem to affect the size and shape of the individual's orbit within the community? Is there any relationship between an individual's orbit and what he or she considers to be his or her neighborhood within the community? Do boys have larger or smaller orbits than girls

or are they about the same? If you were a city planner, how would you use the information gathered about personal orbits in your community?

REFERENCE: A Guide to Urban Studies, edited by William A. Andrews.

TITLE: Site Selection by Local Business

PURPOSE: To gain insight into the environmental (geographic) factors that local businesses consider in choosing their sites.

MATERIALS: Pencil, paper, eraser.

ACTION: Have each team of two learners select one local business for study.

Phone or visit the business and obtain permission to visit and ask questions about the topic. Make arrangements to visit on a specific day at a given time.

Draw a sketch map of the area in which the business is located and mark on the map the location of the business to be studied and other businesses in the immediate vicinity.

Stand in the vicinity of the business and observe the customers. Do they drive or walk to the business you are studying? From what directions do they come? Are they mostly men or women? Do the customers go directly to the business or do they visit several businesses?

Visit the businessman (owner, manager) and ask questions such as the following:

a. When did you locate at this site?
b. Why did you choose this site over others?
c. Where do your customers come from?
d. What attracts customers to your place of business?
e. At what times of the day/week are you busiest?
f. Do the other businesses in the area help or hinder your business? In what ways?

At a group meeting have the various two-person teams share what they found out. Can you discover a pattern of location for different types of business? What conclusions can you draw on business locations based on your field work?

REFERENCE: A Guide to Urban Studies, edited by William A. Andrews.

TITLE: Grocery Store Safari

PURPOSE: To help learners find out first-hand how important plants are to us.

MATERIALS: Paper and pencil.

ACTION: Take a trip to a grocery store and list the things that are neither plants or whose existence never depended on plants. (Example: milk comes from a cow which eats plants, so milk wouldn't count.) Read labels. Think about where the food comes from, such as sugar from sugar cane, coffee from coffee beans, etc. How long is your list? Do you think you could live eating only those things on your list?

Discuss and compare the lists in the same group meeting or next meeting. Sharing a "plant" to eat, such as coconut, makes a nice additional activity.

ADDITIONAL NOTES: Having extra leaders to work with the members in twos or threes going to different sections of the store helps reduce the confusion. Contact the store owner and enlist his help and enthusiasm. Limit the trip to 15 minutes.

TITLE: Where Do We Live?

PURPOSE: To become familiar with the features of the layout of our town and to gather information about us that will be useful for future transportation planning, community sampling, etc.

MATERIALS: A town map (see your county or town office), Cellotex or other soft fiber board for map backing, colored map pins.

ACTION: Give each learner a map pin and have him/her locate home on the map and insert the pin. The leader can insert a pin at the meeting place.

Explore some questions:

- Who travels the farthest to meetings? The least?
- Do members represent all the major regions of town or only a few?
- Who lives closest to sites below?

Place other markings on the map:

- Major ponds and streams in color.
- Key open space areas and parks.

TITLE: Energy Savers

PURPOSE: This project is designed to make us look in an "energy mirror" and see ourselves as we really do spend energy. Few of us really do know how much energy we use wisely or spend foolishly.

MATERIALS: Notebook.

ACTION: For two or more days keep an exact account of the energy you use. Record in your notebook every time you 1) turn on a light, 2) start an electrical appliance, 3) get into a car or bus, 4) watch TV, and so on. Be sure you write down the amount of time you use the energy.

Also note energy that is being used for you, even if you are not turning it on, such as lights at school, school bells, etc.

After you have logged all your energy uses, go back over and see where you could have saved or not used energy at all. Answer questions such as: 1) Did I turn the light off when I left the room? 2) Could I have watched TV with someone else and did I leave it on when no one was watching? 3) Was the trip in the car necessary or could it have waited? 4) How could members of my family, school or club save energy?

Help think about ways to train and encourage others to form energy-saving habits.

ADDITIONAL NOTES: This project can become an interesting project for members to bring to others at home or school. Teachers and/or parents may become involved in helping make this a scientific and meaningful project.

TITLE: Neighbor Numbers

PURPOSE: To have learners become aware of the population dynamics of their neighborhood and their possible implications for the future.

MATERIALS: Paper, and pencils, copies of survey form below, toothpicks.

ACTION: Have learners, individually or in small groups, make a survey of their neighborhood using the following checklist.

POPULATION SURVEY OF YOUR NEIGHBORHOOD (ONE BLOCK)

I. First house on your block (address)_____

Last house on your block_____

II. Total number of houses in your neighborhood_____

III. Number of (a) Adults (21 and over); (b) Young people (14-20); (c) Elementary school age (5-13); (d) Infant (birth-4); and (e) Neighborhood youngsters attending your school.

House #1 a._____ b._____ c._____ d._____ e._____

#2 a._____ b._____ c._____ d._____ e._____

#3 a._____ b._____ c._____ d._____ e._____

Total a._____ b._____ c._____ d._____ e._____

After the survey the group can summarize its data on a big chart. Explore the questions the learners raise as a result of this activity. Ask the youngsters: What number of individuals result from successive generations with families having four children? (Let them arrange toothpicks to represent the individuals of each generation.) Explore the following questions: What is the total population of the community after each generation? How would you explain the differences between the numbers of individuals at generations one, two and three? Guess what the total population would be after the fourth generation. How many individuals would result if the number of children in each generation was equal to the number in your family? What questions do you have?

Using the figures, imagine what your neighborhood might be like two or three generations from now. Is there room for enough housing? What about food, water, and other basic materials?

Meet with a member of the planning board. Have that person explain how the board is planning to handle the problems of increased numbers of people over the next few generations.

REFERENCE: Lowell A. Seymour and Adell Thompson, "Population Change: A Unit for Upper Elementary Urban Students."

TITLE: Viewpoints

PURPOSE: To have the learners meet a variety of people in the community and broaden their perception of the community by exploring and examining different viewpoints.

MATERIALS: Tape recorder and tapes.

ACTION: Have the group prepare a list of questions that they would like to explore with people in the community. By doing this it will be easier to compare the various responses. Such questions might include:

What do you think of this community as a place to raise children?

Do you think this is a good place for retired people to live?

What do you think are the best features of the community?

What are its poorest features?

What changes need to be made most immediately?

Next make a list of key occupations in the community whose viewpoints on these questions you would like to see represented. These might include: mailman, teacher, editor of newspaper, policeman, cab driver, etc.

The next task is to determine who will interview whom, and then set about with question list and tape recorder to interview these people. Have each member of the group record his or her views on these questions before going out on the other interviews.

The learners will then want to listen to the various tapes and make some sort of compilation and summary of the various viewpoints. On what points is there the most agreement? Disagreement?

Note: See Appendix A, p. 181.

TITLE: Bottle-Boogle

PURPOSE: To have the learners examine the used container waste issue and develop an action position.

MATERIALS: Rolls of shelf paper or pads of newsprint, magic markers, tape recorders, copies of flowchart symbols.

ACTION: This activity has three major components: flowchart production, interview collection, and roadside sampling.

(1) Flowchart production:

Flowcharts show the steps needed to accomplish a task. They are a helpful tool to visualize our ideas. Solomon's chart of flowchart symbols gives some common "visual grammar" for the process. Have teams of learners prepare flowcharts to illustrate their solutions to one or more of the following problems:

a. Construct a flowchart to illustrate the history of the pop bottle from the point of raw material extraction to final disposal of the bottle.

b. Demonstrate what happens to both a returnable and nonreturnable bottle from the point of manufacture to disposal.

c. Illustrate the important decisions made by a shopper choosing a returnable or nonreturnable soft drink container in a grocery store.

Different groups will have different ways of solving these problems. Have each share with the others their process and their solution. The group may wish to explore some of these questions:

- What are the most important decisions to be made with respect to recycling?
- Why will one person decide to take bottles to a recycling center while a neighbor will throw them away?
- Why do many retailers object to the recycling possibility?
- Is the dump really the end of the process (Terminal Interrupt)?

(2) Depending upon the interest generated in Activity (1), the groups may want to make field trips into the community and conduct interviews with a variety of people--consumers, retailers, bottling plant workers, landfill operators, etc.--to collect their viewpoints of the disposable container issue (see Appendix A, p. 181). Share the taped interviews with all the learners. Do they change any of the views expressed in answering questions in Activity (1)?

(3) If your community is about to embark on a recycling campaign, or if throwaway containers are about to be banned in your state, it will be useful to choose several test strips of highways or vacant lots and make careful counts of litter of all kinds, recording both type and number, and, if you choose, by weight.

Litter type	# of pieces	Total weight

Date_____
Site_____

Do each test site several times prior to the recycling project or implementation of the law. After the program has been implemented for several months, re-do your survey to see what changes have taken place. Report your findings to the whole community.

REFERENCE: Les Solomon, "Bottle Bill Activities for the Classroom."

TITLE: Janet's Dilemma

PURPOSE: To give the learners an opportunity to explore the conflicts inherent in a local government's rezoning of residential areas (private property) for use by the general public (eminent domain) and evaluate the legality and justice of such decisions.

MATERIALS: Copies of the case study below.

ACTION: Have the learners read the case study below. Then assign the participants one of the three roles: Janet, Janet's parents, the renters. Have all those of a given role get together to answer the appropriate questions of the case study. Bring the whole group back together to share their feelings and insights.

The Case

Janet has lived in her present home for 14 years. She attends a neighborhood school and has many friends who live in the area. Her family has a limited income and is happy to occupy this house because the mortgage payment is low. Janet's family also supplements its income by renting an adjoining garage apartment to another family.

Recently, however, the state has decided to put an interstate highway through this area, and Janet's house lies in the path. Janet is only one of the hundreds of members of families who face this problem.

Discussion Questions

You are Janet:

How do you feel about this move?
What are some of the things you will hate about moving?
What legal rights do Janet and her family have?

You are Janet's parents:

You have lost a part of your income--how will you make up this loss? Should the state compensate you for this loss?
You decide to go to court because you do not agree with the value the state placed on your property--a value that was based on the county tax assessors' evaluation. You say the property is worth $5,000 more than the state has offered. How can this conflict be resolved?

You are the renter:

As the young couple who rented the apartment, you will also be homeless. Do you feel the state has any obligation to you? What alternatives do you have?

FOLLOW-UP: If the learners get really involved in this activity, they may want to interview people who have gone through such an experience, or public officials who would be involved if such an event were to really happen, such as an assessor or lawyer. They can share their findings with the group (see Appendix A, p. 181).

REFERENCE: Adapted from: Pinellas County District School Board, Interdisciplinary Unit on Land Use and Social Action (ED 128 289).

TITLE: Exploit or Recycle?

PURPOSE: To help learners gain some real idea of use of at least one resource in the community and its economic and land use implications. To given learners an opportunity to exercise basic math skills.

MATERIALS: Fact sheets--which should contain the following statements:

(1) There are 52 weeks in the year.
(2) It takes about 30 years for a pine seedling to reach pulpwood size in prime pulpwood country.
(3) One acre of land can grow about 500 trees.
(4) The (name of your local paper) generally weights about _____ ounces. Its Sunday edition weighs _____ ounces.
(5) It takes about 17 trees to make one ton of newsprint.
(6) The current price for recycled paper in our area is _____ per pound.

ACTION:

(1) Count the newspapers used in the home for one week. Using the weight of an average newspaper, determine the weight of the newspapers each family uses in a year.

(2) Have the group share their findings and determine how much newspaper is used by all the families of the group in a year. What is the average use per family per year?

(3) Multiply the figure found in the last question by the number of families in your town (see Town Report or inquire of local officials) to determine approximate newspaper consumption in the town or city.

(4) Using the information gathered and the fact sheet, work out answers to the following questions:

- Approximately how many trees were used by the group's families to meet their newspaper demand this year?
- How many for the town or city's needs?
- How many acres does it take to grow the trees needed for these newspapers?
- How long did it take to grow them?
- How long before there will be replacements for these trees?

(5) Have the learners list what happens to old newspapers in their homes. What happens to the bulk of papers?

- If all the used newspapers were collected for recycling, how much would it be worth?
- How would this affect the amount of land needed for producing paper pulp?

(6) Find out who in your community recycles old newspaper. Interview the people in charge. How much paper do they collect each year? Based on your figures, what percent of local paper gets recycled? Can you figure ways to get more people to recycle their newspapers? If more people recycle their paper, what happens to the price per pound (or ton) that the recycler will receive?

TITLE: Nose Count

PURPOSE: For learners to develop understandings about what is happening to local population.

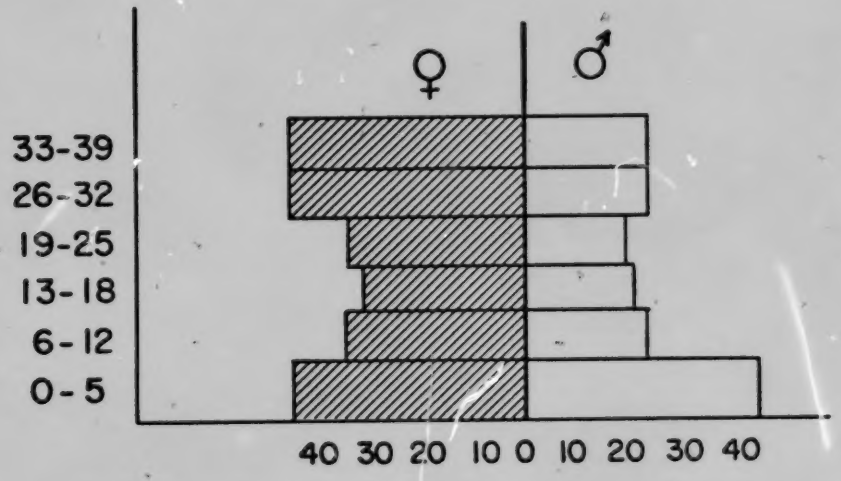
MATERIALS: Graph paper, blank map of the community, ruler, paper and pencil, colored pencils, local newspapers, census data (library).

ACTION: For at least one month the learner should check the local paper birth record and obituary columns, and carefully record the births and deaths in the community. Using this data, graph the information on a single figure, using one color for births and another for deaths.

Contact real estate offices to determine how many people moved into and out of the community in the past year.

These figures (particularly if you collect data on births and deaths for a year) indicate how much the community has grown or declined in the year.

Using the census reports for your community, plot the population for this century on a bar graph. Using the latest census figures, on graph paper plot a population pyramid of the community.



What trends do you see in population for your community? If birth/death and emigration/immigration rates remain the same, what changes will occur in your community in the next ten years?

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Section V

Understanding Ourselves

All the knowledge in the world is of little use unless the individual is a reasonably self-confident, self-actualizing individual. The individual must feel "OK" about him/herself to be able to put knowledge to work not only for him/herself but for the betterment of conditions for other people and living things in general.

Activities in this section are designed to help build self-understanding and self-confidence along with a better understanding of others. Very often, we can only really see ourselves through how others perceive us. Nonetheless, as Noel McInnis so aptly captured in the title of his now-classic little publication, "You Are An Environment."

TITLE: Snorkeling

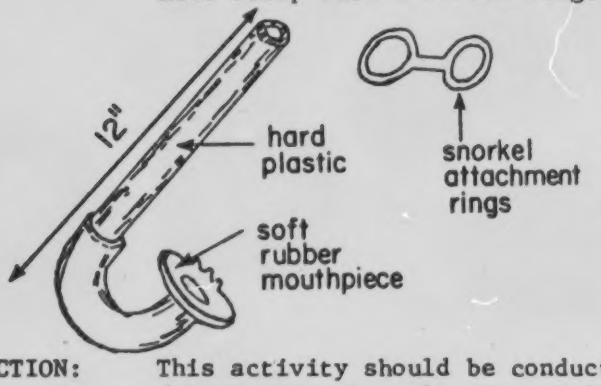
PURPOSE: To help individuals develop their sense of self-worth and personal competence. It provides a chance to observe the underwater world firsthand and is fun.

To face the challenge of functioning in an alien environment.

MATERIALS: Snorkel and face masks (can be rented, borrowed or bought--try to get one for each member, or share them), bathing suits, towels, warm-up clothes such as sweat shirts, beach blankets; lunch or snack foods; tide charts.

Fitting of face mask--A face mask fits well if, when you hold it up to your face and inhale, it stays on without the strap. Have each individual try this and make sure the mask fits well or it will leak.

All masks should be of good quality. Do not use toy masks. Glass on masks should be tempered with soft form-fitting rubber sides. Do not use masks that have snorkels built into them. On a good mask, the snorkel attaches to the head-strap with a rubber ring.



The snorkel (left) has a tube of hard plastic with soft rubber mouthpiece.

Best length for the snorkel is about 12" with the tube diameter of about 1" or more for maximum ease in clearing of water from the tube.

ACTION: This activity should be conducted at high or medium tide (check tide charts). Use shallow waters until everyone feels comfortable. Two feet of water is adequate to start with and even nonswimmers can participate at this depth by walking on the bottom with their hands. Do not insist that everyone participate. Allow those who are fearful to watch for awhile; they may decide to try later when they see how much fun the others are having. We suggest a ratio of two leaders for every learner at first. Use the buddy system at all times!

1. Divide the group into teams according to swimming abilities:

Group I	Nonswimmers
Group II	Beginners
Group III	Intermediates
Group IV	Swimmers/Advanced Swimmers

Determine swimming abilities for yourself by having each person who says he is a swimmer swim about 50' parallel to the beach. Make sure you check the site for holes or uneven bottom.

2. "Dry Land" Procedures--Have group try on masks and adjust them to fit comfortably. Explain that you must breathe through your mouth once the mask is on your face. Breathe normally. (Watch for some who may start to hyperventilate, and remind them.) When people are comfortable with masks, have them put the snorkel in their mouths. Allow them to keep mask and snorkel on for a few minutes until they seem relaxed.

3. At The Water's Edge--Have learners, with mask and snorkel on, lie on their stomachs in the water and put just their chins in the water. If everyone seems happy, have them move out a little deeper and submerge their faces and look around. Let them walk with their hands on the bottom and look around for a bit--do not let them submerge snorkels yet. Nonswimmers should not proceed beyond this point as part of the mixed group. Be alert to be sure all members of the group are still feeling comfortable.

4. Clearing Face Mask Under Water--Some masks will leak a little. To clear them, tilt head to side and press down on lower side of glass on mask with heel of your hand and exhale with force into your mask. Then tilt head back and press on top edge of mask with the heel of your hand, exhaling with force into your mask.

5. Clearing Snorkel of Water--When diving under the water, the snorkel will fill with water but the water will not come into the mouth. Do not try to breathe when submerged; hold your breath until ready to come up. Tilt your head back and look up; just before you reach the surface, start to blow out through snorkel; keep blowing out until you are at the surface. Your snorkel should be clear and ready for you to breathe through.

   Steps 4 and 5 should be practiced in waist-deep water or less, until they can be performed with ease. Make sure each person can clear both mask and snorkel and that they do not become upset or frightened at the thought of getting water in either place. Individual nonswimmers may want to learn how to clear mask and snorkel.

6. You should be ready to snorkel now. Remind everyone of safety rules and to stay with their buddy at <u>all</u> times. It is a good idea to keep the 2:1 ratio even now for the first experiences, as it is possible for a person to get some water

and choke a bit. Remain calm and reassuring. Do not allow anyone over his head unless there is a lifeguard present. Everyone can have a good time in water that is chest deep or less.

7. Have group meet and "debrief" on their personal feelings about functioning in an alien environment. How did they feel personally? What new worlds were opened? What did they like least? What did they learn about themselves?

TITLE: Getting In Touch

PURPOSE: To heighten awareness of the senses and initiate a sense of spiritual oneness with the earth.

MATERIALS: Space, and preferably a sunny day.

ACTION: Have the group form a big circle. Then have everyone lie face down and spread-eagle on the ground, palms down.

Now talk to the group slowly, gently. Tell them to close their eyes and to relax. Have them concentrate on relaxing fingers and toes, then arms and legs. Remember, talk slowly and quietly. Have them relax their torsos and heads.

Can they feel the cool of the earth and the warmth of the sun? They can feel it on belly and back. They feel warmth and cool sinking into their body. Concentrate on where in their body the two meet.

Now let the bodies begin to sink into the ground closer and closer to earth, lower, lower.... Now let silence prevail.

Let them return to their former level of consciousness at their own pace. You can, as an alternative, bring them back sharply to emphasize the contrast. You will have to be the judge.

Finally, let the members of the group share their feelings about this experience.

TITLE: Personal Collage

PURPOSE: This is both an ice-breaking activity and a chance to make a personal statement about who you are for sharing with others.

MATERIALS: Scissors, construction paper or poster board, stacks of old magazines that can be cut up, rubber cement or paper paste, magic markers, crayons, pencils.

ACTION: On a piece of large construction paper or poster board paste up pictures of things and activities that are important in your life. If you cannot find appropriate pictures to cut out, make sketches to mix with the pictures. You can also glue on natural objects if you so desire. The important thing is to put in as many items as possible that speak to your interests. DO NOT PUT A NAME ON THE COLLAGE AT THIS TIME.

Spread finished collages about the room. Discuss the kind of person that each collage represents. Does anybody recognize who the person is represented in the collage? Once it is determined whose collage is under discussion, glue on a name tag.

Allow time for everyone to view the full gallery of collages and ask individuals about interests expressed in each collage. Did you discover new things about old friends? Discover new friends with shared interests? Change your opinion about someone you thought you knew but found out you didn't?

TITLE: Creation

PURPOSE: To foster creativity and a reaching for inner resources.

MATERIALS: Almost any outdoor area with at least a small amount of diversity, pencil and small paper.

ACTION: Have the group form a large circle holding hands, facing outwards. Have people drop hands and take two steps forward. Each person then sits, crouches or squats at that point.

The leader then instructs them that in the next 20 minutes they are to "make" something from materials they can reach from that spot. They may not go more than one body length from where they are. They may construct something or draw something or write something. They may not talk to one another during this time.

At the end of the appointed time they all get a chance to share their creation with the group.

Every time with every group is a new experience!

TITLE: What's In A Name?

PURPOSE: To help the learner think and express how he or she feels about him or herself and express it through the vehicle of the name.

MATERIALS: Pencil and paper.

ACTION: Leader asks the following questions, members jot down notes for answers. Then go around group and have each one give their answers.

- Who named you?
- Were you named after someone? If so, did the name hold special expectations?
- Are you proud of your name or do you dislike it? If you dislike it, why?
- Is your name so popular that you feel part of a mob or so uncommon that you feel odd or unique?
- Do you have a nickname? A pet name? How did you get it? (List all the different names you have been called during your life.)
- What are you called now, by whom?
- What do you prefer to be called? Why?
- Would you rather have a different name? Why?

TITLE: See Me

PURPOSE: To explore contacts with others while getting to know yourself better. To improve listening skills.

MATERIALS: None.

ACTION: This activity is done in several rounds. The leader asks each person in the group to pick a partner that he or she doesn't know very well.

The partners are given five minutes to tell each other what was a high point during the past week and what was a low point.

Have the discussions stop and ask them to consider the following questions silently:

> Did you really listen to your partner? Did your partner really listen to you? Do you think your partner truly heard you? Did you really share your feelings with your partner or did you screen your thoughts and feelings carefully? Did you worry that you were talking too much or too little? In selecting a partner were you the chooser or the chosen? Would you have contributed more to the discussion if there had been more time? Was your partner like you or quite different from you? Do you like having a partner who is more like you or more different from you? Would you have liked your partner to have some of your experiences? Would you like to have some of his or hers?

Now have each learner choose a new partner and exchange views on a different topic. Suggestions might be:

- Tell each other candidly why you selected the person as a partner
- Tell each other what is your favorite nonhuman form of life and why
- Tell each other what you think is the environmental problem that grieves you most and why
- Tell each other who is your favorite hero, living or dead, and why

Run this activity two to four rounds, reading the questions again for silent answers between each round.

Finally assemble the whole group and discuss their feelings about the activity. Did they feel more or less comfortable at each round? Did their answers to the questions change significantly between rounds? Does anyone have any personal statements they would like to make or share with the group?

TITLE: Getting to Know Us

PURPOSE: This is a simple activity to help build a picture of the group for both learners and leaders. It should be understood that there may be some hesitancy in answering the more delicate questions but that if the list moves right along with hands popping up and down the esprit will end up in more open fashion.

MATERIALS: None unless you want pencil and paper to tally and to predraft questions.

ACTION: The group assembles and votes by raising hands on the following questions or other questions you want added:

HOW MANY OF YOU.....

___ have a pet at home
___ would like to live on a farm
___ would like to live in a different city someday
___ like chocolate ice cream
___ like asparagus
___ like spiders
___ think school is fun
___ have a best friend
___ like to stay up late at night
___ like to go on long car trips
___ like rock music
___ like snakes
___ daydream sometimes
___ would rather watch a sports event than play
___ have only one parent living at home
___ like to be teased
___ sometimes tease others
___ receive an allowance
___ enjoy getting wet
___ expect to smoke someday
___ would like to change your name
___ would like to have an important job someday
___ can swim
___ would like your mother to have a new baby
___ have a private place to go when you want to be alone
___ think it's all right for girls to play with Hot Wheels
___ go to Sunday school or religious class
___ wish you were an only child
___ are frightened of the dark
___ think it's all right for boys to play with Barbie dolls
___ would like a wild animal pet

ADDITIONAL NOTES: The action should not go on too long but it does help the group paint a group portrait of diverse interests and provides clues to the leader of potential sensitive problem areas in selecting activities or getting involved in various ways with the learners.

TITLE: Environmental Mime Dancing

PURPOSE: To sharpen the learner's observational skills and stimulate creative expression.

MATERIALS: None special, unless learner desires a costume. A tape recorder or record player will be needed for the music during the performance, however.

ACTION:

(1) Select and study an animal (fish, bird, mammal, insect, etc.) of your choice. Note:

   a. its habitat
   b. mannerisms (walk, feeding behavior, flight pattern, etc.)
   c. self-preservation (how it captures its food or avoids its enemies)
   d. any other observations you think are unusual and which seem to characterize the animal

(2) Decide upon music that captures a feeling of the ways of the animal chosen.

(3) Prepare a dance portraying your animal.

   a. establish a theme for your dance
   b. perform your dance. Ask your audience if they can guess what the animal is and what of its activities your dance portrayed.

SPECIAL NOTE: Although this is basically an activity for individuals, it is possible for pairs of learners to choose the same animal and design a dance that illustrates how two members of the same species interact.

REFERENCE: Youth Conservation Corps, National Forests in Florida.

TITLE: Aloneness

PURPOSE: To help the learner get in touch with his or her feelings concerning nature, beauty, peace, inspiration, oneness. To help develop a sense of aesthetics.

MATERIALS: Journal and writing instrument.

ACTION: (1) Aloneness in a natural environment.

a. Spend at least one hour in a place removed from the general activities of man, such as a hillside, forest, quiet lake, stream or meadow--someplace that is aesthetically pleasing to you.

Remain absolutely quiet and tune all your senses to the environment. Smell, touch, listen, watch, taste (don't taste unfamiliar things), and think.

b. Share your experience through your journal--what words describe this experience of solitude (insignificant, insights, uncomfortable, lonely)? Do you feel yourself to be an actual part of nature? Was there any special spot that seemed to be especially yours?

(2) Aloneness in a man-made environment.

a. Try the same experience that you had with a natural environment where there is human activity or in a man-made environment. Repeat the process used in your aloneness with nature. Concentrate on not being distracted.

b. Compare the experiences and share with others your feelings. Can you find solitude in a man-made environment?

NOTE: This is a very personal experience. Be very honest in your statements. Different people respond very differently. You are searching here for your feelings.

REFERENCE: Center for the Development of Environmental Curriculum (ED 099 230).

TITLE: The Only Way To Have A Friend Is To Be One

PURPOSE: The group will share the qualities of friends and will understand that having a friend means being a friend.

ACTION: Leaders--ask the group to discuss the ideas about friendship illustrated below:

The only way to have a friend is to be one.
A friend is someone who cares about me.
A friend is someone who understands my feelings.
A friend is someone who helps me.
A friend is someone who listens to me.
A friend is someone who ....

Ask each child to name tbe qualities that he or she looks for in a friend.

What do you feel this sentence means: "The only way to have a friend is to be one." Allow each child to respond in his or her own words.

Ask the group to consider: In what ways can they be a friend to their environment? In what way is their environment a friend to them? Can they be a friend to the environment without being friends with each other?

REFERENCE: Elardo and Cooper, Developing Social Living Behavior, p. 83.

TITLE: Knowing Me--Knowing You

PURPOSE: The following activities will help learners investigate the whys and wherefores of their personal actions and the actions of others, leading to a better understanding of themselves and their society.

ACTION: Note to Leader: Do one or more of these activities as pieces of a meeting or trip. Do not do these until the group has begun to show some coherence and a beginning respect for each other and the feelings of others.

(1) Jokes are often a socially acceptable way of expressing values and prejudices.

Collect five jokes, take turns telling them to the group. See if you can figure out what makes them funny.

Follow-up: Can jokes hurt someone's feelings? Discuss how this can happen, and see if you understand why it happens.

(2) Role-playing can give individuals in your group an opportunity to express how they feel about many things.

Choose an animal or plant to become. Tell how it makes you feel.

Be your mother, father, sister, brother, or anyone you want. Try to act and think like they do. In a short play, try to show how they might handle a problem with you. How did you feel during the play? Did the play help you see the other person's point of view?

(3) Everyone at some time has had things happen that make them feel stupid, or does something stupid. Discover why these things happen. Let your friends help; you help them.

Make a list of things that have happened to you that make you feel stupid. List "stupid" things you have done. Try to figure out why these things happened, and why you acted that way at the time. Set up a plan that could change both.

(4) Help a friend solve a problem. What makes something a problem? Discover a real problem you face and haven't solved...get some help from someone else in your group. (Activities 3 and 4 can be combined.)

(5) Habits are usually actions we do without thinking. To change habits requires bringing them to a conscious level.

Figure out your two best habits and two worst habits. Add two good habits, drop two bad habits. If you like, you may promise yourself a reward for successfully completing this activity. Discuss with the group the problems involved in dropping bad habits or starting good habits. How could other members of the group be more supportive in helping solve these problems?

TITLE: Night Ramblings

PURPOSE: To provide learners a chance to explore the world of night physically and psychologically.

MATERIALS: Flashlights (for emergency use only), one length of rope (allow 2 feet per person), several matches.

ACTION: Lead the group on a night hike over a predetermined route. Use flashlights only in emergency; let eyes become accustomed to the darkness. If a number of the participants are nervous about being out at night, use the rope to "tie" the group together; each person holds the rope with one hand as the group travels. On the walk try some or all of the experiences below. Follow up with debriefing questions presented.

(1) Experience sound. Listen to the night sounds. Cup both hands behind ears to increase sound gathering. Where are most of the sounds coming from? Which ones can you identify? Try to pinpoint locations of sounds, such as a cricket chirping.

(2) Experience tree silhouettes. Try to distinguish one tree from another by the silhouetted shape alone. If you can't identify them, at least note the differences. Follow this up by feeling the bark. Can you begin to tell the different kinds by feel?

(3) Experience smells. How does the smell differ at night from the day? Crush leaves and smell. Smell handsful of soil.

(4) Play with echoes. Can you determine what kinds of surfaces reflect sound best? How far away from a reflecting surface do you have to be to hear the echo?

(5) Experience bioluminescence. Collect fireflies (lightning bugs) in a jar with a lid. How much light will the jar lantern cast in the darkness? Look for glowing larvae (glowworms) of fireflies on the ground.

(6) Experience night light. Identify as many sources and reflections of light at night as possible. Have someone move about 50 feet or more from the group and light a match. Notice how much of an area is illuminated. Notice also how long it takes for our eyes to readjust to the darkness again.

Debriefing questions: Gather in a circle and sit down in a comfortable spot out in the dark. Maintain silence for several minutes, then explore the following:

a. Ask the learners to complete unfinished sentences such as:

   The night makes me feel.....
   I saw beauty in the night when.....
   I felt scared when.....
   I was surprised when.....

b. Ask questions and have the participants raise their hands appropriately:

   How many were frightened when we heard that owl?
   How many felt safe holding onto the rope?
   How many were uncomfortable when we sat in silence?

c. Ask each one around the circle to share something he or she felt strongly about on the walk.

REFERENCE: Clifford E. Knapp, "Walking at Night--Exploring a New Environment."

TITLE: My Town/Our Town

PURPOSE: To have the learner explore his/her personal feelings about the home town, and to compare these with the perceptions of others.

MATERIALS: No special materials.

ACTION: Collect ten objects which symbolize for you your hometown or city (for example: a movie ticket, a discarded gum wrapper, a postcard of a particular statue). Get at least five friends to do the same exercise, each individually.

Get your group together later and explain your choices to one another, and what each symbolizes for you. How are they similar--how different? Talk about why people seem to see the environment in such different ways.

REFERENCE: Allen, Fote, Ulrich and Wollard, Deciding How to Live on Spaceship Earth.

TITLE: Push-Me, Pull-Me

PURPOSE: To provide the learner with a strategy to analyze the forces acting upon him/her as the learner embarks on solving a real-world problem.

MATERIALS: Paper and pencil.

ACTION: State a problem that you face--personal or environmental. Set up your paper as in the diagram below, and fill in this Force Field Analysis. Under Pushing Forces, list all those forces inside and outside you which push you toward solving the problem. Under Restraining Forces, list all those that hold you back.

FORCE FIELD ANALYSIS	
Statement of Problem: _____	
Pushing Forces →	←Restraining Forces

Next take each of the restraining forces and brainstorm ways you might lessen it. Record all your thoughts.

Then, similarly, brainstorm ways to increase the pushing forces.

Examine your brainstorming notes carefully and plan action to solve the problem using information from those notes. Make a contract with yourself to DO something. Move from thinking about solving the problem to some ACTION strategy. Plan to ACT. Resolve to DO something.

If after a period of action you have not resolved the problem, sit down and do another force field analysis. Are there restraining forces you had not earlier identified? Can you brainstorm new ways to tackle existing or new restraining forces or strengthen pushing forces?

REFERENCE: Joel Perlmutter and Fred Stokeley, Let's Get It Together (ED 092 484).

TITLE: I Want It, I Need It

PURPOSE: To have the learner explore his/her basic needs and wants and their potential impact on the environment.

MATERIALS: Copies of the data charts below, pencils, and reference books.

ACTION: Hand out the data charts and have the learners complete them. They may need time and reference books to complete the right-hand column of Data Chart 1. If you are pursuing this as a group activity, the groups will want to share the information and the charts among themselves. It contributes to mutual understanding among group members.

Data Chart 1:

List your important possessions	List them again with the most important first.	What natural resources are needed for the first three?
	1.	1.
	2.	
	3.	2.
	4.	
	5.	3.
	6.	

Data Chart 2:

List things you need to survive	Categories they fall into			
1.				
2.				
3.				
4.				
5.				
6.				
7.				

Data Chart 3:

Copy your important possessions from Chart 1	Which could you give up (check one square for each item)?			
	Completely	Twice a Week	Occasionally	Never
1.				
2.				
3.				
4.				
5.				
6.				

If you did the things on Chart 3, how would you feel? _____

_____

If many people did the same things, what difference would it make in your community? _____

_____

_____

In the country? _____

In a poor country? _____

Having done this activity, are there any things in your life you plan to do differently? _____

_____

REFERENCE: Stapp and Cox, Environmental Education Activities Manual, Upper Elementary Activities (ED 119 947).

Section VI

Influencing Change

There are many ways we can make individual changes in our lifestyles that can have a real impact on the environment, but the greatest impact is from the sum of human activity. One may even well describe Environmental Quality as the net sum of the consequences of individual action.

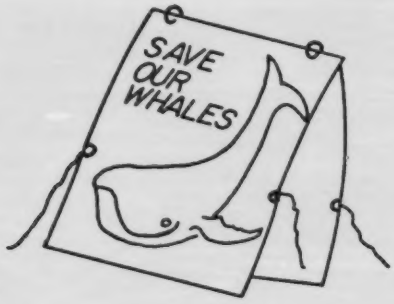
To make significant changes in the trends toward environmental improvement and away from environmental degradation, we frequently must organize and bring about group action and influence thinking in a broad scale. Activities in this section focus on how we influence and are influenced by others.

TITLE: March to a Different Drummer

PURPOSE: To use creativity in expression to communicate ideas to others.

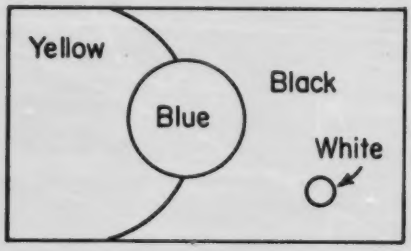
MATERIALS: Poster board, magic markers, glue, string, rulers.

ACTION: Through group brainstorming or individual research, develop a number of slogans about nature or the environment. Put these slogans with appropriate art work (original or pasted-up collages) on the big poster boards. Each person should make two posters. These should have large letters that can be read at a distance so that the two posters can be tied together and worn "sandwich style" in a local parade.



Have the whole club march in a local parade to publicize the club and spread environmental messages to the watchers.

ADDITIONAL NOTES: You may want to devise a banner for your local program to carry in the parade. This could be flanked by an American flag and a Flag of Earth. The Earth Flag can be purchased from: Flag of Earth Company International, Box 702, St. Joseph, IL 61873.



TITLE: Choices--Planning For Our Future

PURPOSE: This activity is about personal and community priorities. Economic concerns often influence the action people take as individuals and as groups. Skills developed in activity are: identification of consequences and causal relationships, identification of similarities as well as differences between personal and community priorities, and determining appropriate actions which would influence others.

ACTION: Read the situation below and try to identify what you would do if you were faced with such a situation. Try to be as realistic as possible in your choice of actions.

Situation

A profitable industry wants to locate in a small town because a river running on the outskirts of the town would be an easy and inexpensive (to them) way to dispose of industrial waste. The town has many poor people who would be willing to work for just about any wage. The industry would be a boon to the town and increase its economic standing in the state.

You have been invited to attend the town council meeting and voice your opinion about the location of the industry. You are aware of the possible pollution of the river which currently provides clean drinking water, a site for recreational activities, and homes for many animals, fish, and waterfowl. However, you also realize that the industry would provide better incomes for many poor families and increase the standard of living for the community. You are personally acquainted with poor families who desperately want the industry and the opportunities it will bring.

Questions to Consider

(1) Will you take a stand for or against the new industry at the council meeting?

(2) Consider the cost of losing the river as a source for drinking water, recreational activity, and wildlife refuge, and the expense of cleaning it up after it has been polluted.

(3) List arguments you will use to help persuade fellow citizens to see your point of view.

(4) Consider the plight of the poor in the community.

(5) Will your relationship with any of your friends be affected by your decision?

(6) How will you feel toward those who oppose you?

(7) Is there any possibility of a compromise solution?

NOTE: The group could debate these issues with one team for the industry and one against it. Each team could present its arguments before a panel which represents the town council. The council job would be to decide the best, long-term solution for the entire town.

REFERENCE: Elardo and Cooper, Developing Social Living Behavior.

TITLE: See-Care-Do

PURPOSE: To develop an environmental ethic and help discover strategies to combat environmental problems.

MATERIALS: Graph and chart paper, cameras, slide projectors, cassette tape recorders, explorers' journals, pencils.

ACTION: Divide the group into smaller units of 2 to 4 people each. (If possible, have those who live near each other work together.)

(1) Ask each group to tour the neighborhood they have chosen to work in (or the whole group might tour the neighborhood where the group meets).

a. Take pictures of various environmental problems.

b. Record observations. Who is affected by the problems? Identify strategies to deal with the problems.

c. Develop a plan for alternative solutions to problems identified.

(2) Projects to follow up the tour.

a. Information campaign--column in local paper.

b. Slide show and talk for presentation to local groups --women's club, service clubs, etc.

c. Develop an opinionnaire--see suggested format, pp. 135-136.

d. Contact town officials to share information and urge stronger enforcement of environmental laws.

REFERENCE: Stapp and Cox, Environmental Education Activities Manual.

A Suggested Format for an Opinionnaire

for See-Care-Do Activity

This opinionnaire might be used in conjunction with a slide show or informational talk given by group representatives to interested community groups or leadership.

INTRODUCTION: "Tonight we have seen a number of environmental problems which affect our community. We would like your opinion about the problems and what may be done to alleviate these problems."

OPINIONNAIRE:

(1) Please prioritize the following problems as to importance in terms of immediate action. (1 = most important)

List of Problems	Circle One
_____	1 2 3 4 5
_____	1 2 3 4 5
_____	1 2 3 4 5
_____	1 2 3 4 5

(2) Discuss what you feel to be the source of each problem.

Problem	Source
_____	_____
_____	_____
_____	_____
_____	_____

(3) Suggest some solutions to these problems below.

Problem	Solution
_____	_____
_____	_____
_____	_____
_____	_____

(4) Would you be willing to help with these solutions by contributing time, money, equipment?

[ ] Yes
[ ] Time
[ ] Money
[ ] Other (please specify) _____
_____
_____

[ ] Equipment
[ ] No, I'm not interested

If yes, please sign below:

Name _____ Telephone _____

Address _____ Town _____

Thank you for your help,

_____
Your Group's Name

_____
Your Town Your State

TITLE: City Government--Can You Make It Work?

PURPOSE: This activity will give the group a chance to watch city or town government in action, a chance to play out various roles to improve their understanding and the opportunity to see the difficulty and trade-offs involved in problem solving.

ACTION: Observe a town, city council, or selectmen's meeting. Arrange to meet with a member of the city council or a selectman to explore the responsibility of the office he/she holds and some of the major environmental problems the city/town needs to deal with.

Have the group pretend that they are responsible for $100,000 to improve the environment of a town or city. Choose some members of the group to act as mayor, council member or selectmen. Decide where and how the money will best be used. (Group members not taking part as government officials should act as concerned citizens or lobby groups and apply pressure by trying to convince officials to consider their points of view.)

Research and visit the areas where the problems exist. See if you can get some expert opinions about these important problems before you make your decision. Try to give equal effort and consideration to each problem you are exploring.

Be sure to thank any people that have been helpful to you during this investigation.

TITLE: Piled Higher and Deeper

PURPOSE: This activity will help the group visualize the problems involved in solid waste and improve their awareness of the causes and cures of solid waste problems.

MATERIALS: Notebooks, pens, paper grocery bags.

ACTION: Pre-Meeting Activity:

(1) Ask learners to see how much trash they collect in one day from their homes.

a. Use standard size grocery bags.
b. Separate bottles, cans, plastics and paper trash.
c. Make a simple list which shows the amount of each item as follows: Bottles - 3 Cans - 2 Plastics - 4 Paper trash - 1/2 bag
d. Bring list to next meeting.

(2) Follow-up Activity:

a. Add totals from all lists to get total number of bottles, cans, plastics, and paper trash collected by the group for one day. Make a sample chart to show group results.
b. Find the average for your group by dividing each total by the number of families in your group to learn the average amount of trash per day per family.
c. Multiply each by 7 to get the average amounts of trash generated per week.
d. Multiply these totals by 52 to get yearly totals.

Most of the group will be surprised by the amount of trash generated in a year by a small group.

(3) Hold discussions on:

a. How can we reduce the amount of solid waste?
b. What items of trash could be recycled?
c. Which natural resources are represented by items found in the trash? Which natural resources are being the most quickly depleted according to your trash counts? Are these resources renewable or nonrenewable?

FOLLOW-UP ACTIVITY: (Separate meeting time)

(4) Visit your local waste disposal area to find out:

a. The size (area) of the landfill.
b. How much the landfill has grown per year. Is this the original site?
c. How long town officials expect this site will last.

d. Approximately how many tons of trash are brought here weekly.
e. What plans the town has made, if any, to prepare for the time when this site becomes filled?

HELPFUL RESOURCE PEOPLE:

Director, Sanitation Department
Department of Public Works
Public Health Officer
Town Selectmen

TITLE: Peer Persuasion

PURPOSE: To have learners take a position regarding an issue, and affirm this position through positive actions in the group. Part of this activity also involves learners in the process of persuading others.

MATERIALS: 3 x 5 cards, pins, magic markers.

ACTION: This activity involves the learners with the processes of valuing and has very specific roles for the leader and the learners.

The Leader:

(1) Presents the issue and position statement. (Example to follow.)
(2) Directs learners to indicate on 3 x 5 cards whether they are "for," "against," or "neutral," and pin the cards on themselves.
(3) Instructs students to engage in persuasion of other learners to change their positions (15-20 minutes).
(4) Makes sure the learners all understand the ground rules.

a. Nonargumentative persuasion is the rule. Logic and solid information should be used to sway other learners' opinions. There should be no physical action or threats.

b. Individual learners may choose to maintain or change their opinions.

c. Individuals may choose to pass during this discussion time without judgment by leader or other learners.

The Learners:

(1) Each takes a position with regard to the stated controversial issue (examples to follow).
(2) Each indicates his/her position by pinning on a 3 x 5 card showing "for," "against," or "neutral."
(3) Each attempts to persuade those of different positions to change.
(4) Share observations, feelings, and ideas regarding the experience.

Step One: The leader chooses a controversial issue, preferably one that affects the local community or is a highly visible one of the day. The issues may relate to such things as land utilization, housing, population, environment, or energy. Make a presentation on the issue which might include a film, news story, article, or verbal description that provides adequate understanding of the issue. Then propose a position statement on the issue. Possible positions might include:

"A proposed nuclear electrical generating plant should/ should not be built."

"The city should/should not be required to provide five acres of park for every 5,000 inhabitants."

"Every community should/should not provide bike paths in order to encourage bike riding and provide for the safety of the riders."

(For later sessions of this activity, learners should be encouraged to generate issues, research background statements, and create position statements.)

Step Two: The learners take their positions, pin on their position cards, and then circulate freely, talking to as many people as possible to persuade them to change their position. Then after 15 to 20 minutes, call the group back to order for discussion.

Step Three: Begin the discussion phase by having everyone identify his/her final position. Discussion might include:

- What arguments or points were most influential in getting learners to maintain or change positions?
- What attitudes of persuasion were a turn-off, regardless of logic?
- Were any more appropriate alternate solutions to the problem or issue put forth?
- Was the information available on the issue adequate?
- What else should have been available?

You might want to try several rounds of this activity using different local issues. Then you may wish to become involved in a real issue. Do the research, take a position, then go out in the community and attempt to persuade others both to your view and action position, be it a vote or change of behavior.

REFERENCE: Richard Cole, A New Role for Geographic Education: Values and Environmental Concerns.

TITLE: Environ-Ads

PURPOSE: To help learners develop creative ways of communicating their environmental concerns to others and practice the art of persuasion.

MATERIALS: Notebooks, drawing paper, poster board, crayons, paints, construction paper, etc.

ACTION: This is a two-part activity of which the first part can be bypassed. However, doing it does help the learners and the leader gain some helpful insights for part two.

Part I: Either visit with your local TV or radio station or newspaper advertising departments or have someone from those departments meet with your group. Observe the production of an advertisement. Find out what the key ingredients of a successful advertising program are. Before you meet the "consultant," work out a set of questions you want to be certain are answered.

Part II: Working singly or in groups, determine an environmental idea or project that you want to advertise. Determine your target audience. Find out all you can about that group's likes and dislikes. Then design a poster, or newspaper ad, or bumper sticker, or other advertising device to "sell" your idea to that audience. Put your idea to that audience. Put your idea to work. How successful were you?

TITLE: Environmental Rumor

PURPOSE: To demonstrate to learners what happens to complex messages as they are passed from person to person.

MATERIALS: Portable tape recorder.

ACTION: Select six people from the group to be participants, while the rest are observers. The six are sent out of earshot of the leader and main group. The leader brings back one of the youngsters and explains to him the details of a local environmental issue. (This and all succeeding explanations are tape-recorded.) A second youngster is brought back and the first youngster passes the story on to him. A third is brought in and gets the story from number two and so on through the sixth participant.

The leader then plays back the original explanation and the sixth. The whole group then discusses what has happened. How does this affect trying to get the environmental message out to other people?

TITLE: Why Is This Community Here?

PURPOSE: An opportunity for learners to discover what their forefathers found at this site that led them to settle here, and how the area has changed from then to the present.

MATERIALS: Local historical society or a good local history buff, paper for maps, and graph paper, clear plastic overlay sheets, grease pencils.

ACTION: (1) Work up with the group a list of questions to be explored such as:

a. Where was the original site of the settlement located?
b. Why was this particular site chosen?
c. What were the advantages and disadvantages of this site?
d. What were the natural features of the area that promoted or constituted a barrier to site selection?
e. What were the major transportation routes in the area, and how did they influence site selection?
f. What functions did the early settlement perform (farming, defense, exploitation of natural resources, manufacturing, trade, and commerce)?
g. What factors aided the early growth of settlement?
h. How was the early community governed?

(2) Discuss with the group what people, organizations, and resources might be used to get answers to their questions. Have small groups work on interviews and visits that will get answers to the questions. If the interest is high and can be maintained, have the learners gather information on the changes in the community at 50-year intervals since its founding. Have them determine the major changes and factors which affected the growth of the community. Some of the following factors may be identified:

a. Discovery of new resources (minerals, oil, salt, stone, etc.)
b. Development of new types of transportation and new routes.
c. Development of new industries.
d. Commercial expansion.
e. Natural disasters.
f. War.
g. Development of new technology.
h. Expanding job opportunities.

All the information can be expressed in a series of overlay maps and graphs of the various stages: population growth, agricultural vs. nonagricultural jobs, ethnic and minority groups, transportation routes, population density, and community land use.

(3) Put the material together as an exhibit to the whole community. Include the maps and graphs, old photos, postcards, and other media. Put the exhibit where the public can view them (public library, bank window, historical society, etc.).

REFERENCES: Center for the Development of Environmental Curriculum (ED 099 230); Frances Pratt, Acton Public Schools, MA.

TITLE: Spend a Million

PURPOSE: To give learners an opportunity to work together and learn to negotiate for the common good.

MATERIALS: Pencil, paper and a meeting room where the group can be divided into three teams.

ACTION: This is basically a simulation activity in which the goal is for the total group to agree on how to spend a $1 million bequest to the community for environmental purposes. The only stipulation of the trustees is that all three groups must agree in writing in one hour's time on what the project(s) should be.

Divide the group into three teams and give them a few minutes to become acquainted and to choose a spokesman and recorder. Then bring spokesmen from each group together and give them the task, i.e., to agree on what environmental projects the $1 million should be spent and for all three teams to agree in writing within an hour's time.

The representatives then return to their group, present the task and begin work. Fifteen minutes later the three spokesmen meet again and in five minutes make their respective proposals. The task now becomes to merge proposals or accept one. After the exchange of information about proposals, spokesmen return to their teams to discuss new ideas and strategies (five minutes). The spokesmen return to the center to attempt to reach some agreement on how to use the $1 million (five minutes). If the representatives need the time, they meet in the center two more times for five minutes and then return and meet with their teams for five minutes. (The leader may find it useful to point out dysfunctional behavior and suggest alternatives.)

The exercise ends when the spokesmen and all the team members tell what they are feeling to their teams and the group at large.

Most often this exercise ends with no agreement reached within the time limit and the money is lost. One reason is the human tendency to get "locked in" and hold fast to ideas and proposals. It is difficult to let go and collaborate with others even when the prize is a million dollars and all stand to gain by working together.

REFERENCE: Joel Perlmutter and Fred Stokeley, Let's Get It Together (ED 092 484).

TITLE: Idea Molders

PURPOSE: To help learners analyze "The Great American Dream" as shaped by Madison Avenue-style advertising and the implications that lifestyle would have on the environment.

MATERIALS: Data sheet for advertisement analysis, pencil, television set.

ACTION: In this activity youngsters quickly become involved in profound socio-economic relationships that exist between advertising and environmental issues. There is no question that Madison Avenue tactics influence American goals, ideas and behaviors, many of which are contributing to the degradation of environmental quality.

The learners are to identify advertising tactics and make inferences about the influence of these tactics on specific issues. The leader's role is to guide the learners in critically observing advertising techniques and perceiving their significance.

Begin the project by a discussion to clarify procedures and objectives. Then initiate an observation period of at least a week. Using the data sheet, gather the appropriate data for all the ads you view. Be thinking about what impact advertising has:

- on the economy of the United States through the influences on American buying habits
- on the fact that the U.S. is consuming almost half the world's goods and resources yet makes up only 6 percent of the world population
- on the wasteful habits of American society
- on a doubling of American consumption of electrical energy every 15 years
- on the American perspective of ideal family size and population growth
- on American consumption of gasoline in automobiles
- on the average American perspective of the nature of the environment and how the individual should relate to it

After the observation period you may wish to discuss the data, using the following questions among others:

(1) In how many ads did you observe happy families with:

a. 0 children
b. 1 child
c. 2 children
d. 3 children
e. 4 or more children

What can these data tell you about the American perspective of the ideal family?

Is there any evidence in ads that values concerning family size may be changing?

(2) In how many ads were women depicted as:

a. happily married housewives with no other obvious external occupation?
b. having a career other than wife and mother?

(3) In how many ads were men depicted as:

a. "breadwinners" supporting or in some way involved with their families?
b. being happy as bachelors?

What do the observations in Questions 2 and 3 tell you about the expected roles of men and women in our society? How might these perspectives influence America's population growth?

(4) In how many ads do you find the happy family living in:

a. spacious suburbs with large homes and lawns?
b. city apartments and homes?

(5) How many ads did you observe which depicted happy people in:

a. minority group lifestyles? (which minorities?)
b. upper class lifestyles?
c. middle class lifestyles?
d. lower class lifestyles?

Do most ads present people and life the way they are or the way everyone is supposed to WANT them to be?

What effects do you feel the ads might have on lifestyle goals of Americans? On their consumption of luxury products?

(6) What percent of the ads you observed are environmentally sound, i.e., remind Americans to conserve resources and reduce waste?

(7) How many ads:

a. called attention to the positive effects of a product on the environment?
b. called attention to the negative effects of a product on the environment?
c. did not consider the environmental impact of the product at all?

What influence do you feel advertising has on the average American's perspective of the environment and how the individual relates to it?

DATA SHEET FOR ADVERTISEMENT ANALYSIS

Discrete Ads--Television

Advertisement Characteristics

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	Etc.
2 or fewer children																		
3 or 4 children																		
more than 4 children																		
women as housewives																		
women in other careers																		
men as breadwinners																		
men as father figures																		
men as bachelors																		
family in suburban home																		
family in apartment or condominium																		
minority lifestyle																		
lower class																		
middle class																		
upper class																		
conserve energy																		
anti-litter																		
recycle																		
others:																		

Note: Similar data sheets can be prepared for radio, newspapers, etc.

REFERENCE: Hungerford and Peyton, Teaching Environmental Education.

TITLE: Who Decides?

PURPOSE: To involve the learners in discovering that effective decision-making involves considering the pros and cons of alternatives and studying various trade-offs.

MATERIALS: Pencil and paper, telephone and telephone directory, outside speakers, guide to local government agencies.

ACTION: Select an issue of local environmental concern that has been recently covered or is currently being covered by local newspapers, radio, or television. Have the group gather and/or list all the information they can on the selected issue.

Divide the group into teams to seek out all the information from the local sources, not only the media listed above but government agencies, citizen groups, businesses and industries.

After each group has selected a specific information source to investigate, discuss the various ways for each group to use in their investigations, such as:

1) Use the telephone. When using the telephone, make clear with an outline the main points you are interested in discussing with a representative for the particular information source you are calling. Mention your particular interests and key questions and ask for an interview time, either in person or on the telephone. If possible, arrange for that representative person to come and talk with the group.

2) When looking for information from a newspaper, be critical. That is, be aware that newspapers align themselves towards certain groups of people: rural, urban, businessmen, political parties, ...and therefore present information with information relevant to your issue, and try to see who the readership for a particular newspaper is.

3) Write letters, if time permits. Ask for specific information from the person or group you are writing. This makes it easier for them to give you relevant information by a particular time.

4) Whenever possible, meet with people directly. You can usually get the best information this way. Allow yourself to be flexible and open-minded when you speak with someone. Remember, you are seeking information from someone, so be a patient, but questioning, listener.

5) If your issue is being considered in a local meeting, such as a school board meeting, city council meeting, or public hearing (many environmental issues are openly

discussed in local public hearings), try to send a representative from your group to that meeting.

6) When looking at radio and television stations, first call them and see if they have anyone reporting or editorializing on that issue.

7) Whenever you speak with anyone about your selected issue, ask them if they know of other people or groups you might contact to gain more information about your issue. People-contacts often prove to be the most informative sources.

As groups obtain information, compile an outline on which they can jot down the contacts they've made and a brief statement or two about the information the group obtained.

The length of any such issue-investigating activity is flexible and can take a few days to a week or longer, especially if letters are written. After most or all of the investigative work is completed (it is best to set a date by which every group will complete its initial investigations), outline on a big chart or blackboard all of the possible alternatives to the problem selected.

Have a representative for each alternative present the pros and cons, as he/she sees them, of the particular alternative. A good way to do this is to have the group act as a council meeting to decide upon which alternative appears best for your community, county, state, etc. You may want to expand this phase by bringing in outside speakers to present viewpoints to the group.

Have the group evaluate each alternative, its consequences, and the trade-offs (costs vs. benefits). Then the group should decide upon the best alternative (a ballot vote is useful here). The group may then wish to write the local editor, or appropriate government agencies, to express views and rationale.

Review through a group debriefing the things you did. What sources of information were explored? Which ignored? Can you identify the people that makes up the constituency of each of your sources? What groups of people have the most power in making a decision on the issue? Did you have an opinion on the issue before the investigation? Did it change as a result of the investigation? Do you feel the issue is being considered fairly in the community, by viewing all alternatives and the consequences of each alternative, or do you feel this issue is being decided in favor of one group of people over other groups?

REFERENCE: Stapp and Cox, Environmental Education Activities Manual--Junior High Activities (ED 119 948)

Section VII

Improvement and Restoration Projects

This section of activities lists some specific action projects that can be undertaken. However, each community is a discrete setting and it is very difficult for anyone not intimately familiar with the specific setting to make feasible recommendations concerning what local environmental action projects should be. These must be determined locally as the result of sensitivity and concern developed by close study of and living with that specific community. In many ways action projects can be seen as an evaluation of the total program, for the desire to act and the ability to act effectively and responsibly are the result of considerable growth and development.

The leader should also be aware that some action projects can lead to difficult situations and occasional confrontations, as learners ask pointed questions of officials or press hard for an unpopular value position. In such situations, leaders need a large supply of tact, patience, and the time and willingness to counsel the learners through periods of impatience, frustration, and sometimes failure. Even in success, learners need to realize that it takes continuous energy to maintain organization (i.e., success) and that environmental successes are seldom final and require eternal vigilance, whereas failures are generally all too permanent.

Each action project needs to involve a variety of steps which are outlined below:

1. Identification of a Problem Area
    a. someone may bring a problem to you and ask for your help
    b. you detect something in your environment that requires replacement, alteration or repair
    c. some prior experience keeps gnawing at you, demanding your concern
    d. you inadvertently get involved as the result of something else you got involved with

2. Accept Responsibility for Helping Resolve the Problem

3. Gather All the Information You Can About the Problem
    A. who or what caused it?
    b. who has done or is doing something about it?
    c. what is the scope of the problem?
    d. what other issues is it interconnected with?
    e. what resources are likely to be needed to alleviate the problem?
    f. who can help solve the problem?
    g. what references on the problem are available?
    h. what solutions to this or a similar problem have been tried before or elsewhere?
    i. what is allowed and what ruled out?

4. Decide on a Course of Action Based On:

   a. which limits to the problem you can control
   b. resources likely to be available to you, material and human
   c. your potential possible contribution to alleviating the problem
   d. the time available to you to invest in the problem

5. Act

   a. if a group project, be sure each learner knows his/her role
   b. clearly establish a communication system so that every participant knows his/her part in proper sequence and that feedback is provided on progress to date
   c. be prepared for others to back up those who, for any of a variety of reasons, fall short of their part in the process

Appropriate actions for most community environmental problems fall into three broad categories or combinations thereof: ecomanagement, persuasion/education, and political action. Ecomanagement refers to activities that involve direct manipulation of the environment, ranging from putting up birdhouses and habitat restoration to installing energy conservation materials in homes. The other two categories deal with managing people. Persuasion/education is the gentler approach and presupposes that if people only know and understand, they will take the appropriate action. Political action demands that people band together to achieve a goal, utilizing various forms of group pressure that may be more power-coercive than persuasion/education.

Suggestions for categories of issues that might be explored for action projects include the following, adapted from Teaching Environmental Education by Hungerford and Peyton:

1. Availability of open land spaces, i.e., parks, recreational areas. Learners could survey the community for existing recreational spaces and determine whether the needs are being met by existing areas. If not, plans of action could be developed and implemented. (See Park It activity, p. 174.)

2. Preservation of sites with natural and/or historic value. If a site has already been identified locally, you may have a ready-made project. Or you may wish to assess your community and determine if there are unrecognized sites that should be identified and preserved.

3. Existing litter problems in school and/or community. Learners should not only identify heavily littered sites but also the source of the litter. Ecomanagement of such sites is relatively easy and generally temporary. A greater challenge lies in devising and implementing strategies to prevent or at least to reduce further littering.

4. Recycling programs, where direct ecomanagement via paper drives, aluminum or glass recycling tends to be short-lived and ineffective. A long-term energy investment is needed. Consider ecomanagement as a demonstration while working toward achieving governmental or industrial assumption of the recycling effort on a more permanent basis.

5. Wasteful use of water/energy/paper/etc. This category responds well to a variety of persuasion/education activities.

6. Land use planning. If a regional planning office exists for the area, learners may well identify several major issues in local land use calling for citizen political and/or persuasive action.

7. Wildlife habitat/landscaping needs. This is an area in which specific projects abound, ranging from backyard wildlife sanctuaries to volunteering for "green areas" management.

TITLE: Investigating a Parcel of Land for Recreational Use

PURPOSE: To provide an opportunity for older learners to gain knowledge about local government through direct involvement in development of local recreational resources. Through the activity, the participants will develop personal competencies and shape their sense of self-worth as well as sharpen skills of political action and decision-making. In the process they will gain information on determining suitability of sites for various purposes and of laws governing zoning. Special note: This is a long-term (several months) project that will require patience and determination on the part of leader and learner alike.

CHALLENGE: Determine a parcel of land (preferably community-owned) that would be suitable for recreational development. Such land might be a vacant lot, an older park in disrepair and disuse, land within a redevelopment area, a piece of conservation commission land, or even a discontinued railway right-of-way. Study the area carefully for its various potentials for both passive and active recreation. Survey the potential users to determine their proirities and needs. Prepare and submit a plan for recreational use of the land.

The group should understand from the beginning that the appropriate boards may or may not take their project and proposal seriously and that they should undertake it for what they will learn from it whether or not the proposal is finally accepted and acted upon. The more thoroughly the study is undertaken, the more carefully facts and figures are assembled, the more likely it is that the project will be taken seriously. Even so, the realities of local politics or of current fiscal priorities may see a good project ignored or postponed.

ACTION: Step #1 is to survey the community and locate on a map existing recreational sites indicating predominate activity as active (baseball, tennis, volleyball, etc.) or passive (hiking, crosscountry skiing, nature trails, etc.).

Are these geographically distributed to best serve the community's population as far as ready access is concerned?

Obtain a local zoning map. Determine what areas are zoned for recreational use or for which recreation is not an incompatible use. Within these areas select one or more areas that you would like to undertake as your project area(s). Determine who has responsibility for the site(s) you have chosen. Meet with that group or agency and tell them about your proposed project. Find out what, if any, other plans are under consideration for the site(s). Try to gain at least minimum support for your planning project.

Step #2--The learners might wish to divide into sub-committees exploring a variety of things:

a. make a complete inventory of the site indicating all outstanding natural features: flat areas, hills, plant types, animal species.

b. make a survey of the recreational needs of the community the site would most likely service. (This can be very local, or may include several towns.) Consider needs for tennis courts, baseball diamonds, hockey and skating rinks, picnicking, hiking, nature trails, horseback riding, community gardens, etc.

c. Impact study--this committee gathers information on space needs and land type needs for all the various activities that might be placed on the site.

Step #3--Have a recreational or community planner and/or a landscape architect attend a group meeting to discuss your project with you after you have some basic data. Seek this expert's advice on things to consider in developing your plan.

Draw up your recreational plan for the site(s) and share it with potential site users and the group that has authority for the site. You may present these plans as drawings or as a three-dimensional model of the site. Be sure to have figures on the costs of developing and maintaining your project. Seek publicity for your plan and contact individuals or groups whose support will be needed to move the project from a plan to reality.

TITLE: Learn Through Teaching

PURPOSE: For the learner to contribute to the solution of an environmental problem through teaching others what he/she has learned about this issue--to learn how to be part of an information diffusion network. For the learner to participate in the political process.

MATERIALS: Variable, but probably including poster-making equipment and/or equipment for preparing and presenting a slide-tape program.

ACTION: Familiarize yourself with an issue of concern to your community. (In the source group described below the issue was the value of wetlands.) Factor out the most important points. Determine how to make these points clear and interesting to others. Design and develop some programs and instructional aids to communicate these points. You might use such approaches as: slide-tape presentation using photographs the group has taken; prepare an illustrated brochure on the issue; develop a puppet show or skit to make the points; develop a program for local cable T.V. The goal of each of these programs is to educate the adult community about the issue--town or county boards, service clubs, the general voter, special users, or whoever seems most appropriate.

(The source group produced a slide/tape that explains simply the role and value of wetlands in the community; a booklet that was distributed to town voters explaining the role and importance of the town's wetlands and floodplains; and a conflict map of local wetlands and threatening land uses to be used by the local conservation commission and other town boards.)

SUGGESTED BY: Shirley Griffin, Oakmont Regional High School, Ashburnham, MA.

VALUES OF WETLANDS

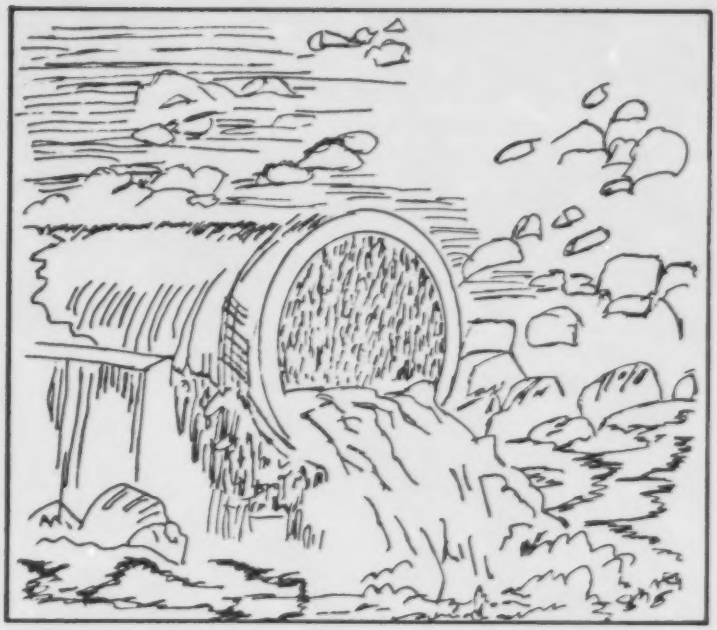
Watershed is the system that moves the water through the ground and how water enters and leaves the ground.

There are five (5) parts to the watershed: groundwater; surface water; floodplains; recharge areas; wetlands.

Wetlands are areas of land where water is at or near the surface for nine or more months of the year; it is usually a discharge area.

There are six (6) roles or values of the wetlands:

Pollution control
Drought control
Flood control
Groundwater supply
Recreation areas
Breeding areas



POLLUTION CONTROL in a wetland allows the silt and other soils to settle to the bottom.

Wetlands also remove dangerous bacteria, and harmful chemicals, through absorption from peat and plants.

DROUGHT CONTROL

Wetlands slowly release water back into streams and lakes during dry seasons.

Wetlands also have a high capacity to hold water.

FLOOD CONTROL

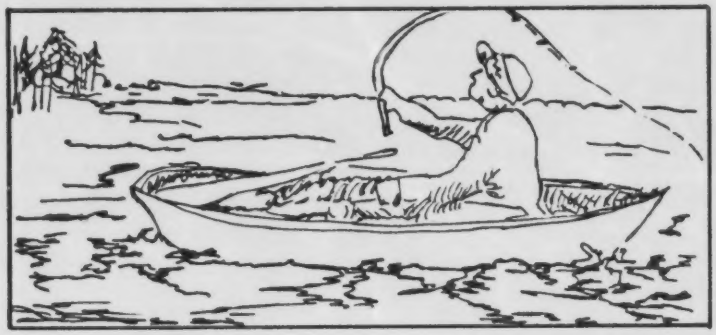
Wetlands absorb excess water from rivers, ponds and streams during periods of heavy precipitation.

GROUNDWATER SUPPLY

Wetlands slowly release water back into the ground where it returns to the water cycle.

RECREATION AREAS

Wetlands provide excellent areas for fishing, hunting, swimming, and camping.



BREEDING AREAS

Wetlands are excellent areas for animals to breed because of the variety in shelter and vegetation.

TITLE: Bike 'Pikes

PURPOSE: To study a community problem of direct concern to many of the learners and involve them in working to establish a satisfactory solution.

MATERIALS: Township maps, data on highway traffic (usually from police or highway department).

ACTION: This activity is concerned with the need to provide bicycle trails in a community to increase bicycle use as alternate transportation and recreation in a safe setting.

(1) In preliminary discussions, ask the group to deal with these questions:

a. What problems can we list which pertain to riding bicycles?
b. How have some of these problems affected you?
c. Where could we travel by bicycle in our township if there were safe trails?
d. If we had the opportunity to plan trails, what are the other problems needing consideration?
e. What are the areas to keep bike trails away from? Why?
f. What other uses could be made of trails?
g. How can we find out how much use would be made of bike trails?
h. What other people in town would use the bike trails?
i. Who can help us determine the safety problems?

(2) Determine routes and alternate routes, keeping in mind the safety factors. Tour the township to familiarize yourselves with each of the proposed routes. Prepare a fairly detailed plan for a suggested bikeway system for your town and include a suggested priority listing of trails.

(3) Discuss the plans with township officials and police department.

(4) Undertake an education and publicity campaign to make others aware of your plan and gain their support to have it implemented.

REFERENCE: Project KARE (ED 157 682)

TITLE: Enviroactivating

PURPOSE: To stimulate learners to perceive environmental issues in their community and help them develop the questioning strategies needed to become involved in the correction of environmental imbalances.

MATERIALS: Time and note-taking equipment (tape recorders or pencil and paper).

ACTION: Have the group select an area of the community for study. Visit the area and compile a list of all the environmental problems they perceive. Then have the group rank the various problems from most to least serious. Next have the group form groups of one or more and choose a problem with which they would like to become involved.

For each group, the following should be explored:

(1) Identify the problem and related factors. Is this really a problem, and why? Specifically, how does it affect the quality of life?

(2) List procedures intended for solving the problems. Who can we go to for help and information? Where can we go to get more information? Is there any data that need to be collected? Student surveys? Scientific tests? Interviews?

(3) Discover what can be done to alleviate the problem. Who can the findings be presented to? Who has the authority to make change? What support groups do they need? What is the procedure or channel of communication for change? What or how do we intend to present a request for change?

ALSO

Each learner should confront his or her own values regarding the issue.

(1) Do they have a choice of values in this issue?
(2) Have they considered the consequences implicit in each of the alternatives?
(3) Are they proud of the ways they chose to confront the problem?
(4) Would they publicly declare their choice?
(5) What have they actually done recently about the problem?
(6) Will they be willing to make the consequences of their solution a regular part of their lifestyle?

REFERENCE: Center for the Development of Environmental Curriculum (ED 099 230).

TITLE: Energy Knights

PURPOSE: To have learners develop skills in energy conservation and share these skills by helping the poor and elderly in cooperation with community agencies.

MATERIALS: Insulation, staple guns, staples, weatherstripping, all-weather tape, caulking guns, caulking compound.

ACTION: Make contact with various local agencies that are responsible for energy conservation and/or assisting the poor and elderly. Indicate that your group is willing to be trained to install energy conservation material properly, and will cooperatively analyze homes and install basic conservation materials if the agency will provide them.

Invite a local builder, vocational education teacher, or skilled do-it-yourselfer in to train the group members in proper installation of energy conservation basic materials and the identification of heat loss areas (see Sherlock Heatloss Activity, page 77).

With the cooperating agency(ies), identify homes to be included in the project. Then divide the learners into teams of about four. Have these teams of Energy Knights go forth and install the conservation devices as needed in their assigned homes. If the home dwellers are willing, you may want to compare last year's heating bills with those at the end of the heating season, following the group's work so that they can see the effect of their work.

NOTE: With the source group of this project, one of the interesting sidelights was that in many of the learner's homes, decisions on energy conservation were instigated by the learners with their parents. They helped reduce high energy bills at home through cost-effective conservation.

REFERENCE: John Dolson, "Environmentally Educated."

TITLE: Put Up Or....

PURPOSE: To have learners examine alternatives for action on civic or social problems, then choose the most suitable form of action and follow through on it.

MATERIALS: Copies of the alternative action worksheet.

ACTION: Each learner chooses an issue of particular interest to him/her and analyzes the variety of options open for personal involvement in dealing with the issue. The learner makes a list of at least five needed changes regarding that issue. They may wish to present their issue and desired changes to the whole group.

Each learner then examines the Alternative Action Worksheet and the group may suggest other actions to fill in the blanks. You may wish to have the group rank the actions according to their effectiveness from most effective (lowest number) to least effective (highest number). Each leader is urged to choose one or more actions to engage in to contribute to resolution of the issue that concerns him/her. At a later date the individual learners may wish to report on their action and what responses, if any, they received. It is important that no one be high-pressured into this activity and that learners be permitted to pass on discussing their actions without prejudice.

Alternative Action Worksheet

Most people want to do something when changes need to be made. However, they remain inactive because they don't know what they might do. Several possible activities have been listed below. In the class discussion the list will be extended. When the list is complete, you will be asked to indicate (for yourself only) which of these acts is your way of doing something. The instructions for rating the actions will be given when the list is complete.

____ (1) Write a letter to the editor of the local newspaper. Public opinion is influenced this way.
____ (2) Write to a business or company. Company policy is often influenced by such communication.
____ (3) Write an elected or appointed governmental official or agency of government. These people are affected by citizen input.
____ (4) Send a letter of support to someone doing something you admire. Everyone needs to know that his or her actions are recognized.
____ (5) Write an organization working for your cause and ask to be placed on the mailing list.

____ (6) Attend meetings of organizations working for your cause.

____ (7) Ask your club, organization or group to have a meeting on the topic of your greatest concern. You can help organize the meeting with the program chairperson.

____ (8) Organize a club or group to work on the problem of your concern.

____ (9) Distribute leaflets in public places or door-to-door.

____(10) Wear a button.

____(11) Circulate a petition. Officials take notice of group statements.

____(12) Make an appointment to interview persons in business or government who are in a position to make changes.

____(13) Contribute time and/or money to an organization supporting your position.

____(14) Take part in picketing or demonstrations and peaceful marches.

____(15) Speak up for your point of view at home or among friends.

____(16) _____

____(17) _____

____(18) _____

Build on this list in the class discussion.

TITLE: Wings At the Window

PURPOSE: To help learners share knowledge with others and help provide others with some joy. To give participants intimate involvement with other age groups.

MATERIALS: Birdfeeders or raw materials for building birdfeeders; bird pictures or drawing materials.

ACTION: Purchase or build birdfeeders to be installed at a local nursing home.

Make or acquire pictures of the birds most likely to visit the feeders. Learn as much about these birds as possible.

Arrange with the nursing home management to put up the feeders where people can most easily observe them and for a place to put the identification pictures. Also arrange to visit the home and tell people about the birds.

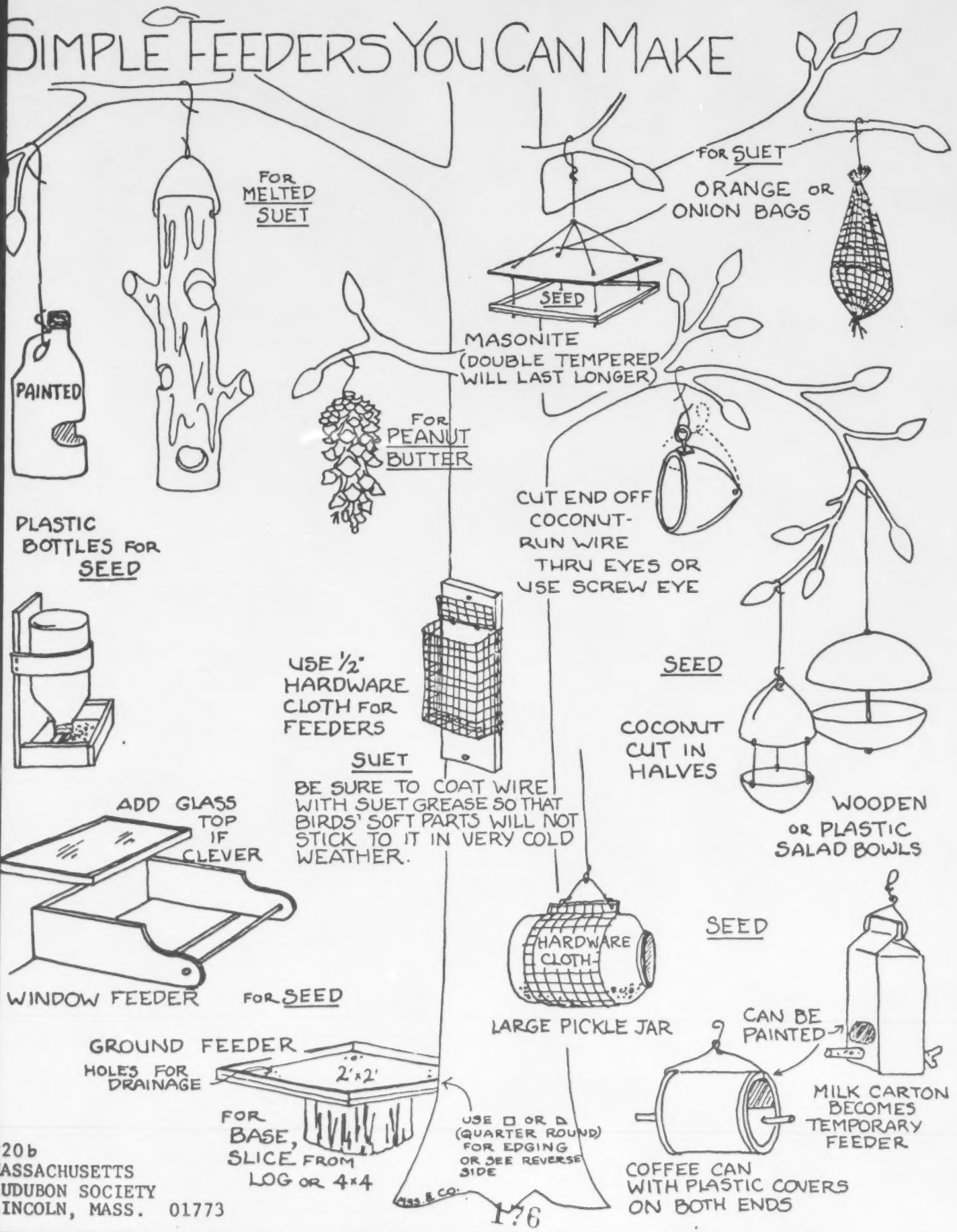
Promise to keep the feeders filled. Be sure to keep this promise for the birds, as they depend on the food supply particularly in winter.

ADDITIONAL NOTES: Accompanying information (pages 169-170) describes some simple feeders you can make from recycled materials.

In summer, you can put up hummingbird feeders and hang orange halves for the fruit-eating summer birds, such as orioles, tanagers and mockingbirds.

You may also want to plant flowers to attract hummingbirds.

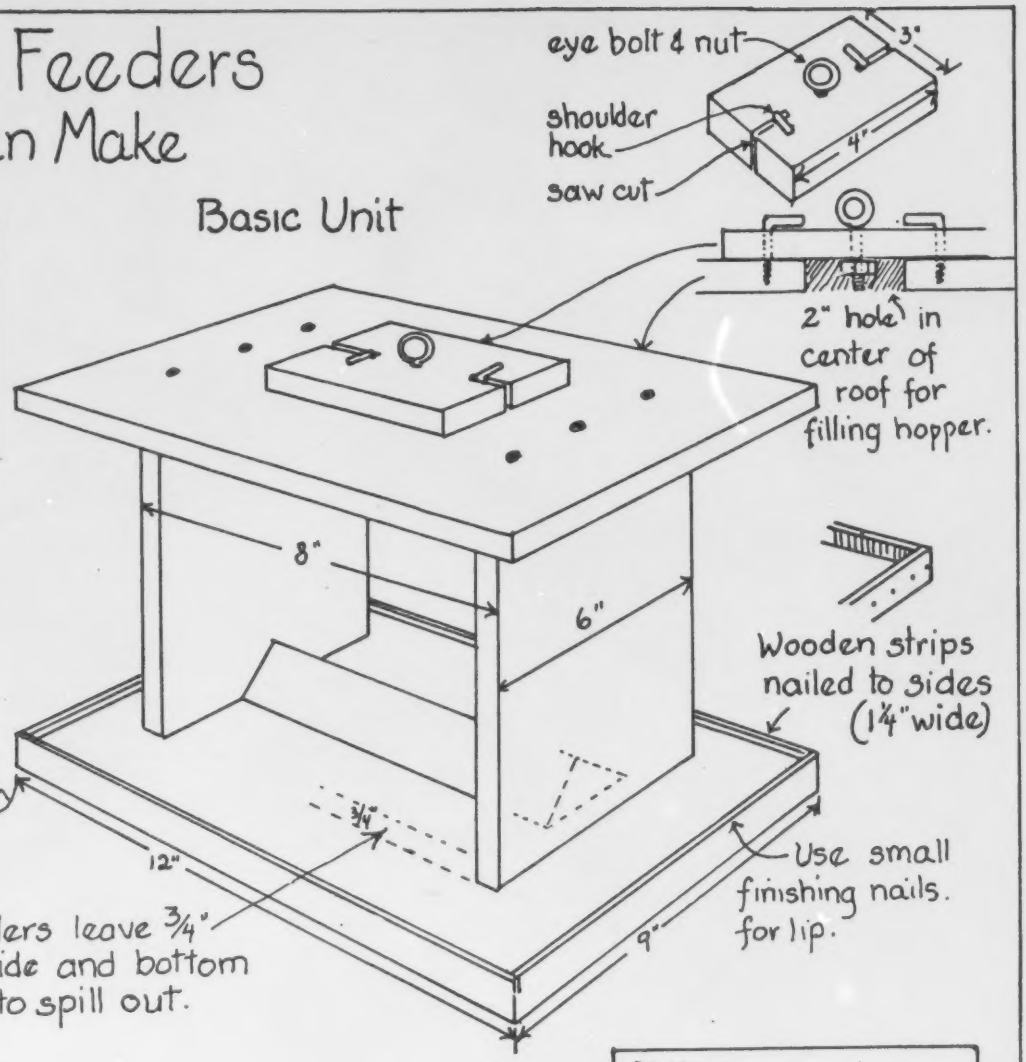
SIMPLE FEEDERS YOU CAN MAKE


FOR MELTED SUET
PAINTED
FOR SUET
ORANGE OR ONION BAGS
SEED
MASONITE (DOUBLE TEMPERED WILL LAST LONGER)
FOR PEANUT BUTTER
CUT END OFF COCONUT- RUN WIRE THRU EYES OR USE SCREW EYE
PLASTIC BOTTLES FOR SEED
USE ½" HARDWARE CLOTH FOR FEEDERS
SUET
SEED
COCONUT CUT IN HALVES
WOODEN OR PLASTIC SALAD BOWLS
BE SURE TO COAT WIRE WITH SUET GREASE SO THAT BIRDS' SOFT PARTS WILL NOT STICK TO IT IN VERY COLD WEATHER.
ADD GLASS TOP IF CLEVER
WINDOW FEEDER FOR SEED
HARDWARE CLOTH
LARGE PICKLE JAR
SEED
CAN BE PAINTED
MILK CARTON BECOMES TEMPORARY FEEDER
GROUND FEEDER
HOLES FOR DRAINAGE
2'x2'
FOR BASE, SLICE FROM LOG OR 4x4
USE □ OR D (QUARTER ROUND) FOR EDGING OR SEE REVERSE SIDE
COFFEE CAN WITH PLASTIC COVERS ON BOTH ENDS

20b
ASSACHUSETTS
UDUBON SOCIETY
INCOLN, MASS. 01773

Hopper Feeders You Can Make

Basic Unit



pper type feeders
n be hung or placed
a post.
mensions are
ggested but you
n use any you like.

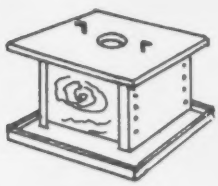
Block~
t absolutely necessary
t keeps seed from
ing up.

On all feeders leave 3/4" between side and bottom for seed to spill out.

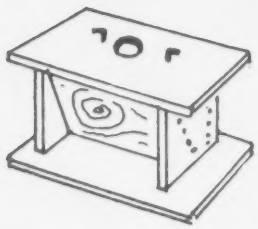
Fittings ~
Use screws except for small nails to hold lip around base.
2 shoulder hooks will keep hopper cover in place
An eye bolt and nut are stronger than a screw eye.

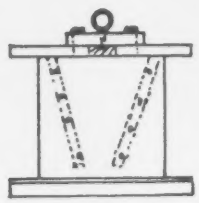
JB/MSS

hoice ①
vertical
wooden
slats

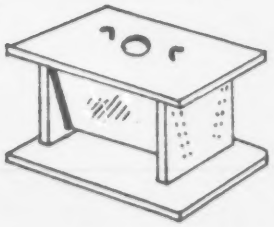


hoice ②
slanted
wooden
sides



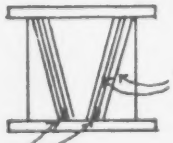


Choice ③
slanted
glass
sides



Method ①

Method ②



wooden guides for glass.

saw cuts
wood blocks to make opening for seed

MASSACHUSETTS AUDUBON SOCIETY, LINCOLN, MA. 01773

TITLE: Winged Folks Motel

PURPOSE: To become acquainted with local migrants; to become aware of the value of open space in cities for wildlife.

MATERIALS: Notebook, pencil and binoculars (A);
Shovels, watering cans, plants (B).

ACTION A: Visit large city parks during spring and fall migrations and see how many different kinds of birds you can identify over a period of several weeks. Keep a count of each kind. Do you find waves of activity during the observation block?

Lack of suitable cover in much of the city causes the birds to concentrate in the "islands of green" formed by the parks. What are the birds' needs? Is there adequate food as well as shelter in the park? Is there a good water supply?

ACTION B: If the parks you use do not have ample food and water for the migrants, get in touch with the Park Department or other agency that oversees that park. See if you or your group can sponsor the planting of some food-bearing shrubs such as flowering crab apples, highbush cranberry, dogwoods, or other plants that please both birds and people.

Your group might try growing some plants from cuttings to transplant to the park, or you might hold a fund-raising event to buy plants. You might arrange to do the planting as well. A slightly more ambitious project is to provide for bird baths or other watering devices.

You will have the best chance of winning support of the park officials if you draw up a plan of what plants you want to plant and where, to show that you are very serious. You may want to enlist the aid and co-sponsorship of a local garden club.

REFERENCES: Gardening with Wildlife, National Wildlife Federation;
Working With Nature, by John Brainerd.

PLANTING FOR BIRDS

Birds need cover as well as food; brush piles, briar tangles and small evergreens make good cover.
Birds like what we call "edge", that is, where two habitats meet: grass and shrubs, lawn and flower bed, or field and trees.
Different species prefer different habitats.
Birds feeding attract even more birds.
Water is always attractive to birds.

Grosbeaks, Robins, Cedar Waxwings, Orioles, Catbirds, Brown Thrashers, Flickers, Purple Finches, Bluebirds, Vireos, Myrtle Warblers, Tree Swallows are some of the birds attracted by berries of the following plants:

DECIDUOUS TREES

Flowering crab — *Malus floribunda*
Best all-round decorative small tree. Fruits in early fall. Pine grosbeaks!

Cherries — Bird, *Prunus pensylvanica* — Black, *P. serotina* — Choke, *P. virginiana*
All these are native cherries. Fruits in summer.

Dogwoods — Flowering, *Cornus florida* — Pagoda tree, *C. alternifolia*
***C. florida*, spring flowers, red fruits and foliage in fall; *C. alternifolia*, small tree, blue-black fruits in late summer.**

Juneberry (shadbush) — *Amelanchier canadensis.*
Small tree, red fruits in early summer, good autumn leaf color.

Washington thorn — *Crataegus Phaenopyrum*
Best of the hawthorns. Bright red fruits into winter. Attractive all year.

Mountain ash — American, *Sorbus americana* — European, *Sorbus aucuparia*
Fast-growing trees, beautiful in bloom. Orange fruits in fall.

Russian olive (Oleaster) — *Elaeagnus angustifolia*
Silvery foliage, silver-scaled fruits in fall. Set several for cross pollination. Fine for seashore sites.

SHRUBS

Barberry, Japanese — *Berberis thunbergi*
Protection, nesting. Red fruits fall to spring sometimes taken by migrants.

Bayberry — *Myrica pensylvanica*
Leaves fragrant. Gray fruits early winter attract myrtle warblers.

Red osier dogwood — *Cornus stolonifera*
Native shrub, red twigs, white fall fruit.

Winterberry or Black alder — *Ilex verticillata*
Deciduous red-berried holly. Fruits in early winter. Likes moist sites.

Tatarian honeysuckle — *Lonicera tatarica*
Deep red flowers and abundant fruit in early summer. Provides nesting cover.

Viburnums — Arrowwood, *Viburnum dentatum* — Nannyberry, *V. lentago* — High bush cranberry, *V. trilobum*. *V. lentago*, blue fruits in fall; *V. trilobum*, red winter fruits.
Vigorous native shrubs that will stand some shade.

Blueberry — *Vaccinium* spp.
Low, medium and high varieties. Fruits in summer.

Elderberry — *Sambucus canadensis*
Deep purple fruits in summer. (This and the next 2 species for the wild garden).

Blackberry — *Rubus canadensis*
A species with few prickles!

Raspberry — *Rubus idaeus*
This and the blackberry make good cover and food. Nesting for catbirds and thrashers.

Multiflora rose
Large size and rank growth, but excellent cover and food. Red fruits in winter.

Privet — *Ligustrum regelianum*
Hardy, makes good unpruned hedge. Black winter fruits eaten by grosbeaks.

Redpolls, Siskins, Goldfinches, Grosbeaks, Crossbills, Titmice, Tree Sparrows, Juncos eat seeds of these:

TREES — Birches
Seeds in winter; aphids in summer.
Conifers, especially firs, red cedar, spruces and hemlock.
Shelter and seeds.

SHRUBS — Shrubby St. John's-wort, weigelia

VINES — Grape, *Vitis* sp.; and virginia creeper, *Parthenocissus quinquefolia*

For Hummingbirds — trumpet vine, honeysuckle, nicotiana, larkspur, columbine, bee balm, red salvia.

Remember, ***a weed patch*** (poke berry, goldenrod, sunflower, pigweed, meadowsweet, etc.) ***attracts winter birds.***

TITLE: Pet Pollution

PURPOSE: To have learners discover the unwanted pet problem, the issues surrounding excessive pet droppings, and pressures on protein resources to feed pets.

MATERIALS: Poster board, markers, animal control officer and/or Humane Society representative.

ACTION: Conduct a pet census of your neighborhood (mainly cats and dogs). How many of these are licensed? How many have identifiable owners? How many of the females are spayed or males neutered? How many are restrained? How many run free? Calculate roughly how many pounds of cat and dog food your local population would consume in a year. At about 60 percent conversion efficiency, about how much manure does this also represent? If all the female animals in your census had one litter a year, how large would your population be in a year?

Far more young animals are produced in a year than there are potential pet owners. These and others end up abandoned to starve or prey on local wildlife. Invite in the local animal control officer or Humane Society official and get his/her views on the magnitude of the problem in your area. Learn as much as you can.

Then establish a local educational program with their guidance:

(1) To encourage people to neuter their animals.

(2) To get more people to restrain their pets.

(3) To get people to understand their ongoing responsibility to the animal and to society before acquiring a pet.

Such education might be in the form of a poster campaign, puppet show, free clinics, cable T.V. public information series, etc.

REFERENCE: Local Humane Society.

TITLE: Park It

PURPOSE: For learners to investigate local recreational needs and design and help implement a small neighborhood park.

MATERIALS: Pencils and paper, topographic map of area, cameras, tools.

ACTION: Poll local residents to determine what they want in the way of recreation. Survey the area to find out what parks are presently available for recreation. How do the types of recreation available relate to those types local residents say they want?

Obtain a map of the study area you have selected. Is there land in the study area that might be used for recreation? Determine who owns these pieces of land. Are there any restrictions on the use of this property?

Develop plans for each area and draw them up so that others can understand and comment on them. Present your plans to appropriate local officials.

With the officials, determine what would be the costs--financial, political, social--of implementing the various plans. Determine how these costs might be met and which of your plans might be the most feasible. Also, determine who will be responsible for maintaining the park and what the annual maintenance costs might be.

If the project appears feasible, have the group prepare and present their ideas before individuals and organizations that make and influence local recreational policy and support the implementation of projects such as yours.

TITLE: Community Learning Trails

PURPOSE: Learners design and implement self-guiding access trails on local public lands to help others become learners about the natural world about them.

MATERIALS: Simple hand and garden tools, materials for interpretive labels or for producing a simple mimeographed, photocopied, or printed guide booklet, simple trail markers, information sources.

ACTION: Meet with local officials who are responsible for local open spaces (Park Board, land trust, conservation commission, water department, or school board). Seek permission to establish a learning trail on a site. This could be a general trail or one specially designed to provide access for handicapped individuals.

(1) Survey the site and list the outstanding natural objects, views, places for viewing natural processes, evidences of past land use, etc.

(2) Lay out a trail to connect as many of the outstanding features as possible. Check the walkway to remove hazards such as exposed roots, rocks or holes. Check overhead and remove any dead limbs that might fall on passersby. Mark the trail with paint spots using one color as trail leads away from starting point, another color seen from the opposite direction to indicate a return to the starting point.

(3) Develop interpretive booklets. Different individuals can be responsible for interpreting different points along the trail. Label each site with a number. Match this number with one in the booklet where the interpretation appears. Those who draw well can illustrate the booklet.

Or, tape the interpretation and loan out the tapes. Users stop the tape after each station or site, move to the next number, then turn the tape on again.

Or, place an individual at each station and have him/her personally interpret the station on advertised days and hours or for special groups.

(4) Publicize your trail and check it out regularly to remove any hazards.

REFERENCES: Brainerd, Working With Nature; Ashbaugh and Kordish, Trail Planning and Layout; Audubon Bulletin, How to Build A Nature Trail.

TITLE: Rat Patrol

PURPOSE: To become involved in dealing with a common urban environmental problem.

MATERIALS: Tin cans and can tops, tin snips, pencil, paper, hammers, nails.

ACTION: Rats survive and spread where they can find adequate food and shelter. Rats are quick to learn about poisons and if they are to be gotten rid of, a campaign to eliminate their sources of food and shelter must be used along with poisons. This is not easy but steps can be taken. It takes both teamwork and individual action.

Form a group (Rat Patrol) to survey the neighborhood for all sources of food for rats and places where they enter the buildings or apartments.

Contact the local Health Department for advice and/or pamphlets on rat control to share with residents. Collect cans with lids. As a recycling project, cover them with wallpaper or contact paper and use them or offer them to others to house food usually kept in paper bags.

Collect #10 can lids from school cafeteria or local restaurant. Use the tins to cover rat holes that have been discovered and nail them in place. Be sure you have permission beforehand. In many communities and neighborhoods the activities of such a rat patrol outside their own home will be viewed with great suspicion. The work of the Rat Patrol will require adequate publicity and a considerable amount of trust on the part of others in the neighborhood.

TITLE: Help When You Need It

PURPOSE: To provide ready access to key local environmental resources for use by all.

MATERIAL: Phonebook, phone.

ACTION: Prepare a Yellow Pages booklet for local environment issues and distribute it widely, using funding from local sponsors, or sell it at a modest fee.

(1) Brainstorm a list of categories of environmental involvement in which a number of community people might need help, i.e., landscaping, home energy assessment, digging a well, putting in a pond, composting, gardening, trash disposal, animal identification, pest control, etc.

(2) Under each category list the local resources which could help with the problem-from government agencies, to business, to private consultants. Give addresses and phone numbers.

Either gather several assurances that each group or person listed is competent in their field or publish a disclaimer to the effect that listing does not necessarily mean endorsement. Check with each group or person listed to be sure they are willing to be included.

Get the listings typed up carefully and proofread. Add decorative line drawings if possible. Reproduce by mimeographing, dry copying, or "instant printing"; collate the pages and staple.

There is a great deal of work to such a directory but it could help many citizens be more environmentally responsible.

TITLE: Backyard Oasis

PURPOSE: To create habitat oasis for small to medium-sized wildlife while using planting, gardening and simple carpentry skills.

MATERIALS: Plant materials, gardening tools, graph paper, reference books, basic carpentry tools and material.

ACTION: In your backyard, a cooperative neighbor's yard, vacant lot, or approved plot on school grounds, develop a small wildlife sanctuary.

(1) Determine what local wildlife, from butterflies to small mammals, might live in or use your area if appropriate food, water or shelter were available.

(2) Using that list, compile a list of their food preferences, shelter needs, space needs and the availability of water. Determine what plants used in gardening would match those needs or could be transplanted from the wild or started from cuttings or seeds from wild plants.

(3) Plot your area on graph paper and design a layout for the planting, being sure to take into account the height and spacing needs of mature plants. Consult with a local garden expert on your plan. Try to have plants that will keep a supply of foods coming throughout the growing season. Also plan for watering sites in your plan. Be sure these watering devices can be easily cleaned as mosquitoes will breed there if water stands unchanged for too long.

(4) Build wildlife shelter such as brushpiles, nest boxes and underground den sites. Be sure to make overall size and openings appropriate to the species you wish to attract.

(5) Implement your plan of plantings over several years and record the wildlife visitors to your oasis. You may wish to register your backyard sanctuary with the National Wildlife Federation.

REFERENCES: Gardening for Wildlife, National Wildlife Federation; Working With Nature, John Brainerd.

TITLE: Watchdog Patrol

PURPOSE: To have learners develop awareness of the need for ongoing monitoring of environmental factors to determine changes that may be occurring.

MATERIALS: Variable depending upon factor being monitored.

ACTION: Select a local environmental concern to be monitored: water quality, air quality, litter quality, soil erosion, spread of plant or wildlife pest (maple die back, gypsy moth, etc.). Within broader categories you may wish to concentrate on one or two factors, i.e., underwater quality focus on phosphates and nitrates or salt.

On a town map, plot a series of monitoring stations and establish a regular schedule for sampling at each station.

Have a local expert train all participating learners in the proper procedures for the necessary tests to be done and done accurately. All data should be kept in a journal so that comparing the data will reveal changes.

You may regularly submit a copy of your data to appropriate officials or you may only decide to do so when and if significant changes occur at specific monitoring stations.

You may periodically wish to publish summaries of your data in local papers so that all can be informed on what's happening.

REFERENCES: Institute for Environmental Education, A Curriculum Activities Guide to Water Pollution and Environmental Studies (ED 154 986); Hall and Morrison, Environmental Studies--A Field and Laboratory Approach; V. Eugene Vivian, Sourcebook for Environmental Education.

APPENDIX A

Community Interviews

Interviews are a useful technique for exploring your community to gain information and diverse opinion on issues which should be considered in arriving at your own considered opinion. Below is an outline of things to be considered in doing recorded interviews. More extensive suggestions may be found in Pamela Wood's You and Aunt Arie: A Guide to Cultural Journalism Based on "Foxfire" and Its Descendants.

The Interview Process

1. Prepare an interview outline of what you plan to explore with those you interview.
2. Practice with your tape recorder beforehand so that you can easily operate it without distracting the person you are interviewing.
3. Plan a formal introduction for the tape including place, date, the interviewee's name, who he/she is, and who you are. Practice the time needed to tape this and then leave enough blank space at the beginning of the cassette or reel so you can add the introduction after the interview. This is to help prevent mike fright by your interviewee as you read a formal introduction in front of him/her and by hearing the end of your prerecorded introduction as you set up the recorder to do the interview.
4. Arrive on time for the interview. Situate yourself where there will be the fewest possible interruptions. Be sure your interviewee is comfortable. Locate the recorder and microphone as inconspicuously as possible. Placing the mike on a folded scarf with one or two folds over the mike will help deaden a few of the mechanical sounds that are all about and tend to "clutter" the tape.
5. Get your interviewee as much at ease as possible. Do not hesitate to start with some chatting or banter before settling down to the serious questioning. Be interested in what is being said. Comment where appropriate but remember it is the interviewee's thoughts you are there to gather, not yours.
6. Keep running written notes on names, places and date to back up your tape and confirm spellings where important. Notes serve as a backup also for those inevitable mechanical failures of the tape recorder.
7. Do not extend an interview longer than an hour. Set the length in your own mind ahead of time and as that time approaches, find an appropriate break in the talk and close the interview. Check any spelling with your person. Thank your interviewee for his/her time. Collect your equipment and leave.

APPENDIX B

Potential Sources of Information About Your Community

This material is at best an imperfect guide that demands some careful interpretation. Local government varies considerably across this nation and agencies of similar function may go by quite different names (i.e., State Police or Highway Patrol). Some places, notably New England, are organized basically along township lines and town government is strong; in other areas, county government is primary. Some sections, again notably New England, have government structures such as Town Conservation Commissions, which are not found in other sections.

However, in order to offer some clues as to potential sources of aid and information, the following listing is offered with full awareness of its New England bias and apologies to other regions whose particular sources of aid may be slighted.

SOURCE	TYPE OF AID
county courthouse, town or city hall[1]	local street and engineering maps, ownership maps and plat books, real estate transfers, land tax and title records, vital statistics on births, deaths, and marriages; offices of other local agencies.
historical society or commission	documents, artifacts, and maps related to the area's past. Usually can recommend individuals with specific knowledge.
local newspapers	reports, statistics and viewpoints on local issues; newspaper office file good historical source for case studies.
city, town or county engineer's office	community boundaries, land ownership, streets, sewers, parks, municipal structures, community planning charts.
Chamber of Commerce	commercial trends, urban development, plans, business surveys, demographic data.
local college or university biology department or natural history museum	identification of local flora and fauna.
planning board or planning commission	information on demographic change, hydrologic surveys, soil limitation surveys, economic trends, planning maps.
local industries and retail stores	sources of materials and goods bought and sold in the community.
local utilities	data on gas and electrical usage costs; field trip sites.
sewer and water commission	field trip sites, information on source and treatment of drinking water and treatment of wastewater.
local health department	information on the local landfill, environmental health issues.
local library	books on local history; general references, such as U.S. census information, statistical abstracts.
town reports	annual reports of town committees and local statistical data.
town conservation commission	reports and maps concerning local open spaces, wetlands and related issues, interpretive brochures.

conservation district and soil conservation service	local soil, water and land use issues, maps, publications and technical assistance.
cemeteries	birth and death dates from the past, indications of ethnic shifts, open space.
mayor, selectmen or city council	current legislation, community planning, redevelopment.
dog officer or warden and/or humane society	scope of the unwanted and/or unrestrained pet problem in the community.
local Rod and Gun club and/or Audubon Society, Sierra Club chapter, Isaak Walton League	local environmental issues of various kinds, speakers to your group.
League of Women Voters	data on local community and information on selected local issues.
U.S. Geological Survey[2]	topographic maps and aerial photographs.
local telephone directory	commercial enterprises and services of the area; ethnic make-up of community.
local land trusts	field trip sites, information on sites that need protection; interpretive materials.

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[1]A good publication on how to use this source is: Walrath, Arthur J. County Courthouse Records--A Basic Source of Data, Bulletin 560 (Blacksburg, VA: Virginia Agricultural Experiment Stations, Virginia Polytechnical Institute, April 1965).

[2]Write for "Index to Topographical Mapping" for your state and indicate area to be covered and map size from:

Map Information Office
U.S. Geological Survey
Washington, DC 20242

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